

AD-A108 673 AIR FORCE SYSTEMS COMMAND WASHINGTON DC  
PATENT ABSTRACT DIGEST, VOLUME II.(U)

AIR FORCE SYSTEMS COMMAND WASHINGTON DC

PATENT ABSTRACT DIGEST, VOLUME 17, (U)

MAR 81 F A LUKASIK

**AFSC-TR-81-66**

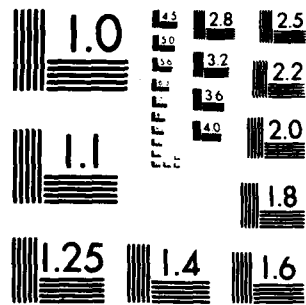
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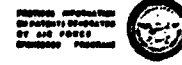
2.4.1. *Effect of temperature*



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS 1963 A.



PROCESSED INFORMATION  
ON AIR FORCE SYSTEMS  
BY AIR FORCE  
STANDARDIZATION



AD A108673

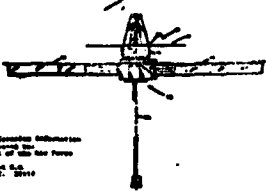
United States Patent  
Abstract  
Patent No. 4,108,673  
Inventor: [illegible]  
Assignee: [illegible]  
Class: [illegible]  
Subclass: [illegible]  
Abstract: [illegible]

United States Patent  
Abstract  
Patent No. 4,108,673  
Inventor: [illegible]  
Assignee: [illegible]  
Class: [illegible]  
Subclass: [illegible]  
Abstract: [illegible]

LEVEL III

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# PATENT ABSTRACT DIGEST



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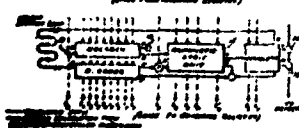
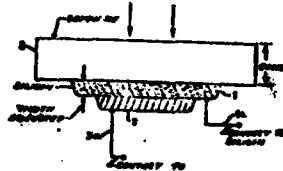
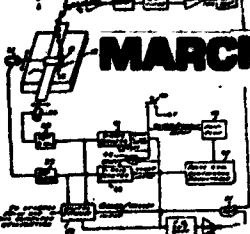


United States Patent  
Abstract  
Patent No. 4,108,673  
Inventor: [illegible]  
Assignee: [illegible]  
Class: [illegible]  
Subclass: [illegible]  
Abstract: [illegible]



United States Patent  
Abstract  
Patent No. 4,108,673  
Inventor: [illegible]  
Assignee: [illegible]  
Class: [illegible]  
Subclass: [illegible]  
Abstract: [illegible]

VOLUME II  
MARCH 1981



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United States Patent  
Abstract  
Patent No. 4,108,673  
Inventor: [illegible]  
Assignee: [illegible]  
Class: [illegible]  
Subclass: [illegible]  
Abstract: [illegible]

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7. AUTHOR(s)  Dr. Frank . Lukasik	6. PERFORMING ORG. REPORT NUMBER	
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## FOREWORD

THE PATENT ABSTRACT DIGEST IS DESIGNED TO PROVIDE INFORMATION ON PATENTED INVENTIONS DEVELOPED BY AIR FORCE RESEARCH AND DEVELOPMENT PROGRAMS. THE DIGEST PULLS TOGETHER ONE-PAGE SUMMARIES OF NEW TECHNOLOGY PROTECTED BY ISSUED U.S. PATENTS. THE MAJOR PURPOSE FOR PUBLISHING THE PATENT ABSTRACTS IS TO SHARE THE TECHNOLOGY WITH OTHER AGENCIES, CONTRACTORS AND MEMBERS OF THE PUBLIC. AEROSPACE SPINOFFS RARELY OCCUR AUTOMATICALLY. THEY ARE AN OUTGROWTH OF DYNAMIC INTERACTIONS OF PEOPLE . . . FROM SPACE SCIENTISTS AND INVENTORS TO THE ULTIMATE USERS IN INDUSTRY. THE PATENT ABSTRACTS ARE INTENDED TO PROVIDE A VIABLE LINK BETWEEN THE PRODUCERS OF TECHNOLOGY AND ITS POTENTIAL USERS, IN EFFECT "CATALYZING" THE TRANSFER PROCESS.

NEW GOVERNMENT REGULATIONS ARE DESIGNED TO PROMOTE FASTER COMMERCIAL USE OF GOVERNMENT GENERATED TECHNOLOGY BY ENABLING PATENT LICENSES TO BE GRANTED. AIR FORCE REGULATION 110-33 PRESCRIBES THE POLICIES, ADMINISTRATIVE REQUIREMENTS, PROCEDURES, TERMS AND CONDITIONS FOR LICENSING AIR FORCE INVENTIONS. SECTION C, PARAGRAPH 11, REQUIRES THE AIR FORCE TO PUBLISH A LIST OF INVENTIONS AVAILABLE FOR LICENSING IN THE FEDERAL REGISTER, THE OFFICIAL GAZETTE OF THE U.S. PATENT AND TRADEMARK OFFICE, AND AT LEAST ONE OTHER PUBLICATION. WE CONCLUDED THAT BARE NOTIFICATION BY TITLE IN THE FEDERAL REGISTER WOULD NOT GO VERY FAR IN STIMULATING COMMERCIAL USERS OF AIR FORCE GENERATED INVENTIONS. THE PATENT ABSTRACT IS THE NEXT STEP UP THE PROMOTIONAL LADDER SUGGESTED IN THE 1971-1972 ANNUAL REPORT ON GOVERNMENT PATENT POLICY AND AIR FORCE REGULATION 110-33.

RECENT LEGISLATION HAS ADDED ADDITIONAL GOVERNMENT EMPHASIS ON THE DISSEMINATION OF GOVERNMENT GENERATED TECHNOLOGY. WE BELIEVE THAT DISSEMINATION OF THE RESULTS OF AIR FORCE R&D PROGRAMS DESCRIBED IN THESE ISSUED U.S. PATENTS WILL HELP REDUCE THE POSSIBILITY OF "RE-INVENTING THE WHEEL" AND THUS SAVE GOVERNMENT R&D FUNDS.

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*Chester D. Taylor, Jr.*  
 CHESTER D. TAYLOR, JR.  
 BRIGADIER GENERAL, USAF  
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# PATENT ABSTRACT

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## United States Patent [19]

Barron et al.

[11] 4,151,539

[45] Apr. 24, 1979

### [54] JUNCTION-STORAGE JFET BUCKET-BRIGADE STRUCTURE

[75] Inventors: Mark B. Barron, Camillus; Walter J. Butler, Scotia, both of N.Y.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 864,065

[22] Filed: Dec. 23, 1977

[51] Int. Cl.<sup>2</sup> ..... H01L 29/78; H01L 29/80; G11C 19/28

[52] U.S. Cl. .... 357/24; 357/22; 307/221 D

[58] Field of Search ..... 357/22, 24; 307/221 D

#### [56] References Cited

##### U.S. PATENT DOCUMENTS

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2504088	8/1975	Fed. Rep. of Germany	357/24
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#### OTHER PUBLICATIONS

Schuermeier et al., "New Structures for Charge-Coupled Devices", Proc. IEEE, vol. 60 (11/72) pp. 1444-1445.

Primary Examiner—William D. Larkins

Assistant Examiner—Gene M. Munson

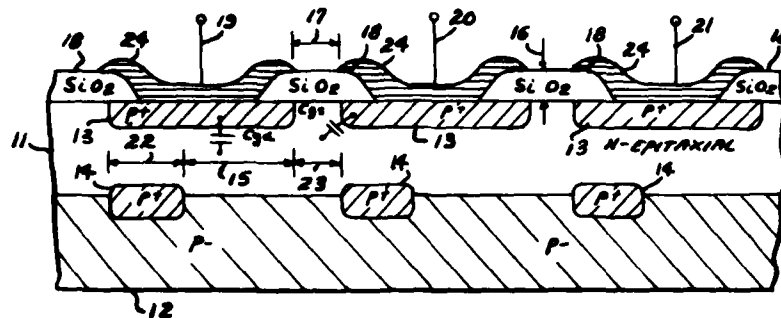
Attorney, Agent, or Firm—Joseph E. Ruz; Robert Kern Duncan

#### [57]

#### ABSTRACT

The novel structure disclosed comprises an n-type epitaxial layer on a p<sup>-</sup> type substrate with p<sup>+</sup> type top gates diffused into the epi-layer and p<sup>+</sup> buried gates aligned with the source side of the top gates. The top-gate diffusion extends far into the drain region.

1 Claim, 3 Drawing Figures



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JAT 00093



# PATENT ABSTRACT

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## United States Patent [19]

Harris et al.

[11] 4,154,415

[45] May 15, 1979

### [54] MODULATING VERNIER FLAP CONTROL SYSTEM

[75] Inventors: Charles V. Harris, Cerritos; George A. Schlammert, Tustin, both of Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 866,144

[22] Filed: Dec. 30, 1977

[51] Int. Cl.<sup>2</sup> ..... B64C 13/02

[52] U.S. Cl. .... 244/83 C; 74/471 R; 74/491; 74/534; 244/83 F; 244/83 K; 244/211

[58] Field of Search ..... 244/83 C, 83 F, 83 G, 244/83 H, 83 K, 83 E, 210, 211, 213, 75 R, 85; 74/533, 534, 471 R, 491; 200/61.54, 56 R; 116/124 R, 124 A, 124 C

### [56] References Cited

#### U.S. PATENT DOCUMENTS

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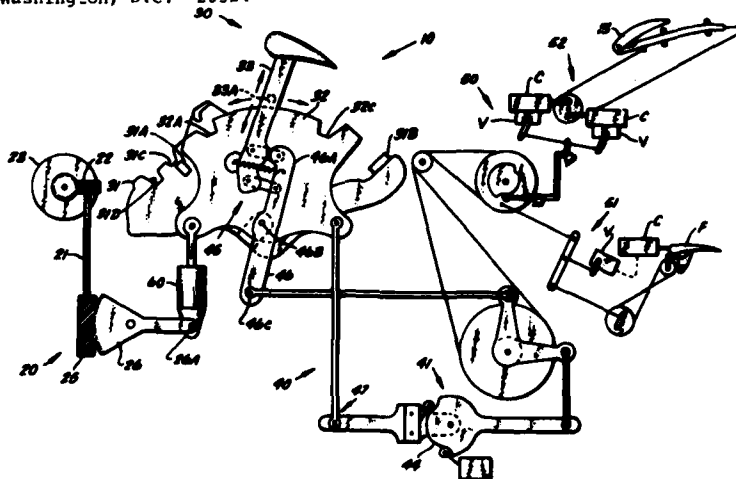
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3,710,644	1/1973	Downing et al.	74/533 X
3,822,047	7/1974	Schmidt	244/181
3,850,388	11/1974	Olcott et al.	244/75 R

Primary Examiner—Barry L. Kelmachter  
Attorney, Agent, or Firm—Joseph E. Ruzs; Arsen Tashjian

### [57] ABSTRACT

A slat and modulatable flap control system for an aircraft having slats in the leading edge of the wing and having flaps in the trailing edge of the wing. A detent pin on a control handle, and any one of four detent slots on a detent crank, can be engaged to selectively, and automatically, set the flaps and the slats (because of the cooperative action of other constituent components of the control system) in optimum positional relationship for takeoff/"go-around," cruising, approach, and landing of aircraft. The control system is ideally suited for aircraft used in "short takeoff-and-landing" situations.

3 Claims, 7 Drawing Figures



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# PATENT ABSTRACT

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## United States Patent [19]

Goldie et al.

[11] 4,155,054

[45] May 15, 1979

[54] MICROWAVE YIG POWER LIMITER USING  
ELECTRICALLY THIN IRIS

[75] Inventors: Harry Goldie, Randallstown; Steven  
N. Stitzer, Ellicott City, both of Md.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 854,449

[22] Filed: Nov. 23, 1977

[51] Int. Cl.<sup>2</sup> ..... H01P 1/22

[52] U.S. Cl. .... 333/17 L; 333/248;  
H01P/5/04

[58] Field of Search ..... 333/17 L, 24.2, 73 W

## [56] References Cited U.S. PATENT DOCUMENTS

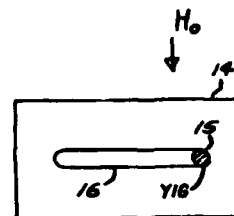
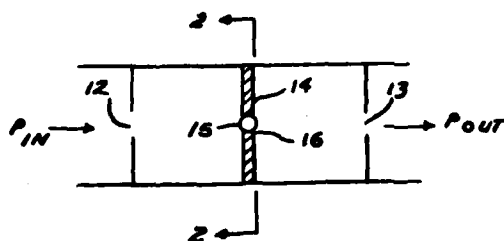
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3,480,888	11/1969	Elliott	333/24.2 X
3,500,256	3/1970	Carter et al.	333/17 L

Primary Examiner—Paul L. Gensler  
Attorney, Agent, or Firm—Joseph E. Rusz; Robert Kern  
Duncan

## [57] ABSTRACT

A ferrimagnetic sphere that is biased to the subsidiary resonance mode and placed within a microwave slotted resonant structure functions as a frequency selective microwave power limiter. When the power level of a signal at the input port exceeds a threshold level, the device prevents the power level at the output port from increasing further. A weak signal present simultaneously passes with relatively little attenuation if it is slightly offset in frequency.

6 Claims, 7 Drawing Figures



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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,155,265**

**Pickett et al.**

[45] **May 22, 1979**

[54] **INTERFACE SHEAR TRANSDUCER**

[75] **Inventors:** Stephen F. Pickett, Albuquerque, N. Mex.; Glenn F. Cochrane, Jr., Belmont, Calif.

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 891,798

[22] **Filed:** Mar. 30, 1978

[51] **Int. Cl.:** G01L 1/26

[52] **U.S. Cl.:** 73/841; 73/765; 73/784

[58] **Field of Search:** 73/88.5 R, 88 E, 101, 73/141 A, 765, 784, 841

[56]

**References Cited**

**U.S. PATENT DOCUMENTS**

2,741,120	4/1956	Ormsby, Jr.	73/141 A
3,576,128	4/1971	Lockery	73/141
3,602,866	8/1971	Saxe	73/88.5 X
3,673,861	7/1972	Handy	73/101

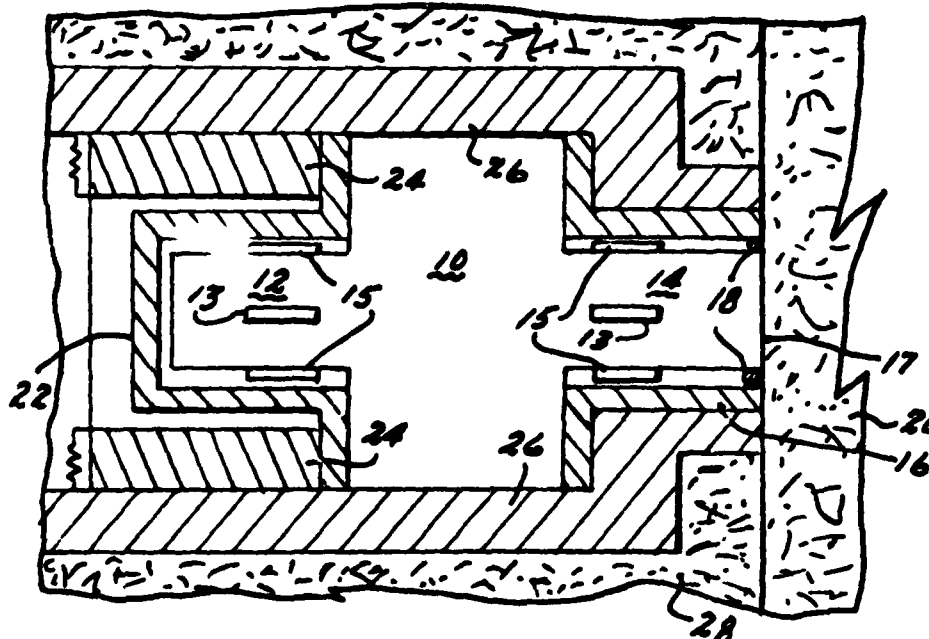
**Primary Examiner**—Charles Gorenstein  
**Attorney, Agent, or Firm**—Joseph E. Ruzs; Henry S. Miller

[57]

**ABSTRACT**

A shear transducer having two cylindrical bending beams with two full strain gage bridges so arranged to cancel acceleration induced by forces in the axis of interest.

7 Claims, 4 Drawing Figures



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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,155,286

Mihm

[45] May 22, 1979

[54] WEDGE CLAMP FOR MISSILE LAUNCHER

3,228,297 1/1966 Kossan et al. .... 89/1.806  
3,267,809 8/1966 Sikora ..... 89/1.819  
3,967,529 7/1976 Ingle et al. .... 89/1.819

[76] Inventor: John J. Mihm, 1300 Kirby NE.,  
Albuquerque, N. Mex. 87112

Primary Examiner—David H. Brown  
Attorney, Agent, or Firm—Joseph E. Ruzs; Richard J.  
Killoren

[21] Appl. No.: 856,361

[22] Filed: Dec. 1, 1977

## [57] ABSTRACT

[51] Int. Cl.<sup>1</sup> ..... F41F 7/00  
[52] U.S. Cl. .... 89/1.819; 89/1.5 G  
[58] Field of Search ..... 89/1.819, 1.812, 1.806,  
89/1.8, 1.5 G; 24/262, 263 A

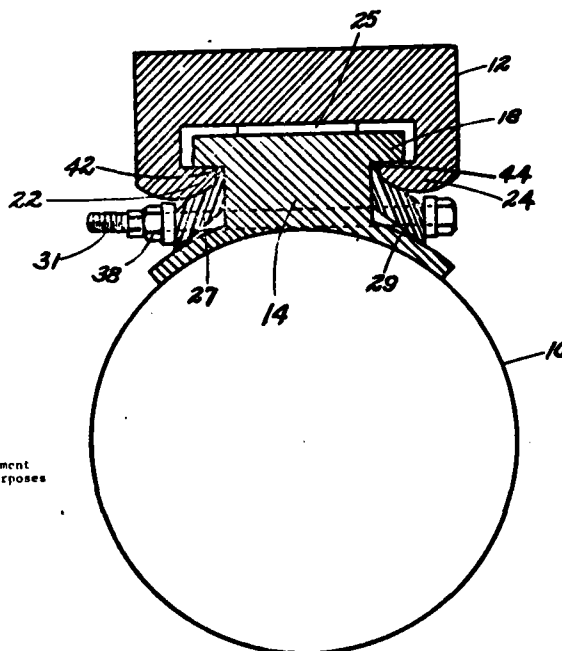
An adjustable clamp for a missile launcher system having a pair of semi-resilient wedge members which fit between the missile hanger lugs and launcher rail and are drawn into the gap by means of a pair of plate members and a pair of bolts. The Teflon wedges fill the gap between the missile hanger lugs and the launcher rail and reduce vibration during captive flight and protect the rails against damage.

## [56] References Cited

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3,115,059 12/1963 Moul ..... 89/1.819

5 Claims, 6 Drawing Figures



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# PATENT ABSTRACT

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**United States Patent** [19]  
**Murawski**

[11] **4,155,308**  
[45] **May 22, 1979**

[54] **SABOT FOR SIMULATION TESTING**

[75] **Inventor:** Paul M. Murawski, Blue Island, Ill.

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 847,952

[22] **Filed:** Nov. 2, 1977

[51] **Int. Cl.:** F42B 13/16

[52] **U.S. Cl.:** 102/93

[58] **Field of Search:** 102/93, DIG. 7

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

4,083,306 4/1978 Woodring 102/DIG. 7

**FOREIGN PATENT DOCUMENTS**

1262830 3/1968 Fed. Rep. of Germany 102/93

**Primary Examiner**—Verlin R. Pendegrass

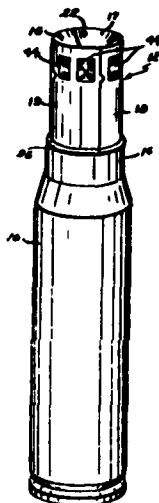
**Attorney, Agent, or Firm**—Joseph E. Ruaz; Richard J. Killoren

[57]

**ABSTRACT**

A sabot, having four quadrant sections, for use in testing of impact damage of metal fragment-type products. The quadrant sections include molded alignment guides and a depression which forms a central cavity for holding payloads. Recesses are provided in the quarter sections to reduce weight. An external gas plug flare is provided on the external surface of the sabot. The sabot has a conical recess at the forward end with a hole into the interior of the sabot to enhance separation of the quadrant sections after the sabot has left the gun barrel.

1 Claim, 11 Drawing Figures



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# PATENT ABSTRACT

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## United States Patent [19]

Sanok, Jr.

[11] 4,155,579

[45] May 22, 1979

### [54] ROTATING DETENT LATCH MECHANISM

[75] Inventor: John S. Sanok, Jr., Arnold, Md.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 840,332

[22] Filed: Oct. 7, 1977

[51] Int. Cl.<sup>2</sup> ..... E05C 13/04

[52] U.S. Cl. .... 292/336.3

[58] Field of Search ..... 292/336.3, 179, 263, 292/206, 113, 69, 1, 226

### [56] References Cited

#### U.S. PATENT DOCUMENTS

2,046,790	7/1936	Phillips	292/179
3,536,349	10/1970	Gardner et al.	292/179 X
3,891,253	6/1975	Renell	292/336.3

### FOREIGN PATENT DOCUMENTS

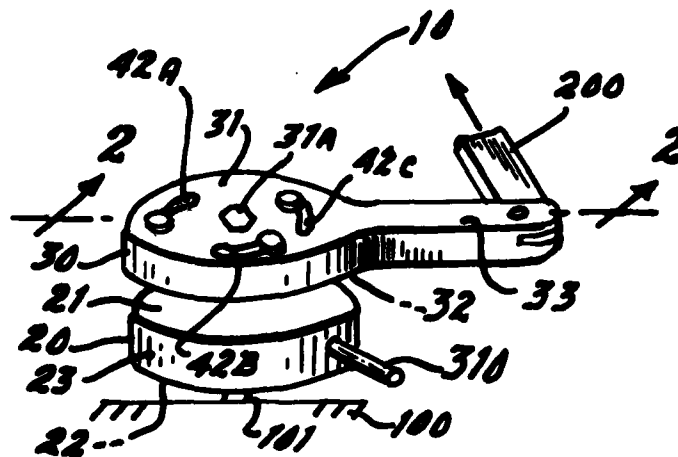
19262 of 1892 United Kingdom ..... 292/206

Primary Examiner—Richard E. Moore  
Attorney, Agent, or Firm—Joseph E. Rusz; Arsen Tashjian

### [57] ABSTRACT

A compact, easily fabricated mechanism which provides a latching and unlatching function in a small volume and through a restricted access. The mechanism offers a positive detent for the latch position, and a forced movement to the unlatched position. It is operable by access through a single hole by use of a simple hexagonal stock tool. For remote actuation the mechanism provides a reliable one-time-only unlatching motion.

4 Claims, 6 Drawing Figures



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AFSC FORM 79c  
SEP 76

R&D RECORD (Patent Abstract)

JAT 00099

AFSC — Address AFB M



# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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United States Patent [19]

[11] 4,155,628

Schlossberg

[45] May 22, 1979

[54] OPTICAL  
MULTIPLEXER/DEMULTIPLEXER WITH  
INTERFEROMETER ELEMENTS

Primary Examiner—Jon W. Henry  
Attorney, Agent, or Firm—Joseph E. Ruzs; Jacob N.  
Erllich

[76] Inventor: Howard R. Schlossberg, 9 Turning  
Mill Rd., Lexington, Mass. 02173

[57] ABSTRACT

[21] Appl. No.: 898,068

[22] Filed: Apr. 20, 1978

[51] Int. Cl.<sup>2</sup> ..... G02B 27/14

[52] U.S. Cl. .... 350/174; 350/171

[58] Field of Search ..... 350/171, 174, 169, 163;  
356/106 R

[56] References Cited

U.S. PATENT DOCUMENTS

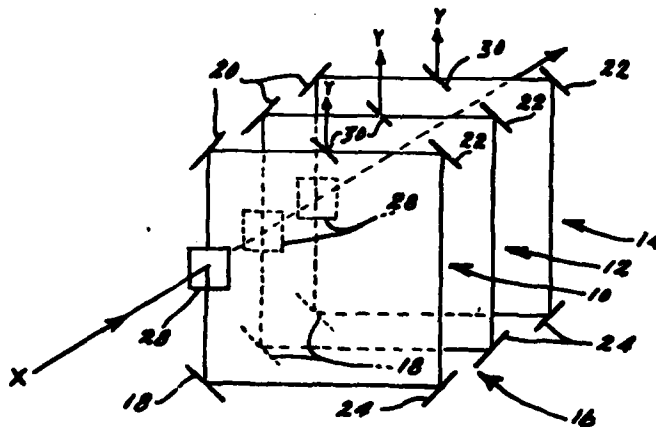
3,879,109 4/1975 Thomas ..... 350/174

OTHER PUBLICATIONS

App. Optics, vol. 16, No. 2, Feb. 1977, pp. 263-265.  
Modern Communications Principles, Stein & Jones,  
pub. McGraw Hill, 1967, pp. 211-215.  
A Quasi-Optical Radiometer, pp. 106-107, and Quasi-  
Optical Receiver Design, J. J. Gustinic, 13121 Minda-  
nao Way, Marina Del Ray, CA. 90291.

A multiplexer/demultiplexer having a series of novel interferometer elements optically aligned with one another in a stacked relationship. Each of the interferometer elements being made up of a plurality of reflective elements forming an optical path therebetween and a pair of beamsplitters for directing a beam of radiant energy into or out of the optical path. The optical path of each interferometer element being defined for resonance at a different frequency whereby in operation as a multiplexer a plurality of beams of radiant energy, each of a predetermined frequency, emerge from the multiplexer/demultiplexer as a single beam of radiant energy having a multitude of frequencies or in operation as a demultiplexer a single beam of radiant energy having a multitude of frequencies emerges from the multiplexer/demultiplexer as a plurality of beams of radiant energy, each at a preselected frequency.

10 Claims, 5 Drawing Figures



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JAT 00100



# PATENT ABSTRACT

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United States Patent [19]

[11] 4,155,780

Honeycutt, Jr. et al.

[45] May 22, 1979

[54] METHOD FOR PRESTRESSING TURBINE DISKS

[56] References Cited

U.S. PATENT DOCUMENTS

[75] Inventors: Fred L. Honeycutt, Jr., Lake Park;  
Myron C. Starr, Jupiter, both of Fla.

3,558,367 1/1971 Eck ..... 148/149

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

Primary Examiner—R. Dean  
Attorney, Agent, or Firm—Joseph E. Ruz; Henry S.  
Miller, Jr.

[57] ABSTRACT

[21] Appl. No.: 866,185

A method for adding a residual compressive stress to the rim of a turbine disk by heating the disk to a uniform high temperature, then insulating the rim from the remainder of the disk and cooling to a temperature wherein the rim yields in tension.

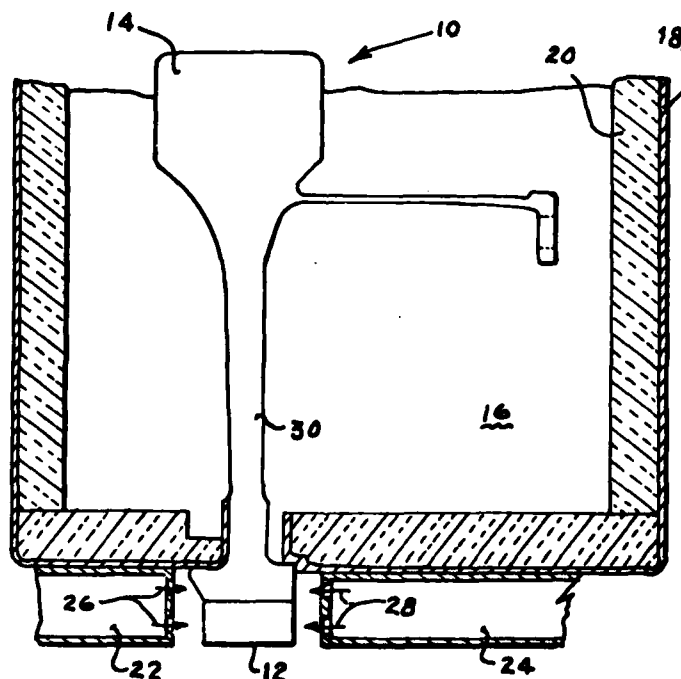
[22] Filed: Dec. 30, 1977

[51] Int. Cl.<sup>2</sup> ..... C22F 1/00

[52] U.S. Cl. .... 148/13.1; 148/14

[58] Field of Search ..... 148/13.1, 13.2, 14,  
148/149, 13, 134

1 Claim, 1 Drawing Figure



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JAT 00101



# PATENT ABSTRACT

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United States Patent [19]

[11] 4,159,454

Willmore

[45] Jun. 26, 1979

[54] PLUG-IN FILTER NETWORK FOR  
SEPARATING A COMMUNICATION  
FREQUENCY INTO DISCRETE  
FREQUENCY CHANNELS

[75] Inventor: Robert R. Willmore, Millersville,  
Md.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 866,125

[22] Filed: Dec. 30, 1977

[51] Int. Cl.<sup>2</sup> ..... H01P 1/20

[52] U.S. Cl. .... 333/20; 325/3;  
333/1.1; 333/110; 333/202

[58] Field of Search ..... 333/1, 1.1, 2, 6, 28 R,  
333/73 R, 73 W, 20; 328/140, 167; 325/3, 4;  
179/15 R, 15 AD, 15 BD

[56] References Cited  
U.S. PATENT DOCUMENTS

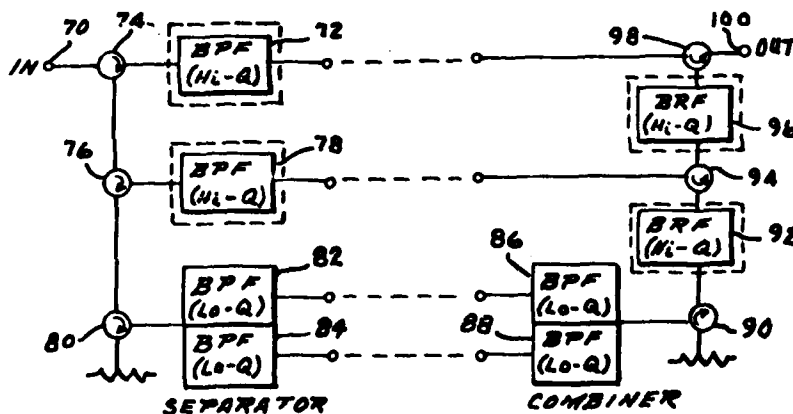
4,109,202 8/1978 Kudas et al. .... 333/1.1 X

Primary Examiner—Paul L. Gensler  
Attorney, Agent, or Firm—Joseph E. Rusz; Henry S.  
Miller

[57] ABSTRACT

A filter network for separating a transmitted communication frequency into discrete channels. A separator, exemplified by a triplexer, includes a pluggable mid-range high Q bandpass filter and a diplexer of low Q bandpass filters. Circulators receive signals reflected from the high Q filter and pass them to the low Q filters. A combiner circuit takes the attenuated signal from the low Q filters and sends it through a circulator to a high Q plug in filter where the signal passes through a circulator where it is combined with the signal from the high Q filter of the separator as output.

2 Claims, 9 Drawing Figures



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United States Patent [19]

[11] 4,157,231

Phillips

[45] Jun. 5, 1979

## [54] HYDRAULIC DRILL UNIT

[75] Inventor: Joseph L. Phillips, Beaux Arts Village, Wash.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 837,330

[22] Filed: Sep. 27, 1977

[51] Int. Cl.<sup>2</sup> ..... B23B 35/00; B23B 47/18

[52] U.S. Cl. .... 408/1 R; 408/9; 408/11; 408/13; 408/16

[58] Field of Search ..... 408/1, 9, 11, 13, 16; 82/2 B, 1 C

## [56] References Cited

### U.S. PATENT DOCUMENTS

3,174,367	3/1965	Lukens	82/2 B
3,259,023	7/1966	Rieger et al.	408/11
3,754,487	8/1973	Nachtigal	82/1 C

Primary Examiner—Leonidas Vlachos

Attorney, Agent, or Firm—Joseph E. Ruzs; Richard J. Killoren

## [57] ABSTRACT

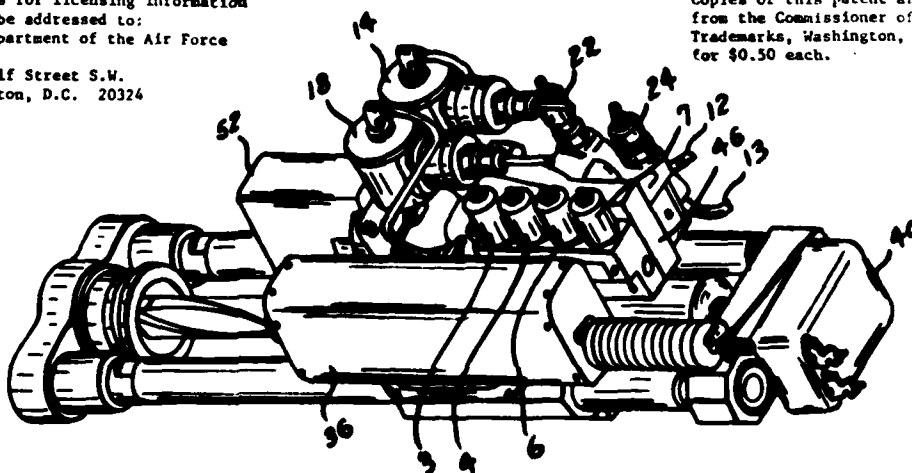
A hydraulic drill unit for drilling multmaterial, thick layer stock having a conventional hydraulic drill modified to have its feed controlled by a servo valve and its spindle speed controlled by a servo valve. A linear encoder is attached to the drill to provide an indication

of drill position. The linear encoded provides 20,000 forward and reverse pulses per inch, depending upon the direction of travel, which are used to determine net feed rate. The net feed rate signal is compared with a command feed rate to control the feed servo valve. A magnetic pickup is used to provide a pulse signal proportional to RPM. This signal is compared with a command speed signal to control the spindle speed servo valve. Differential pressure transducers are used to measure pressure across the hydraulic feed piston and the hydraulic drill motor to provide signals which can be used as indications of chip packing or a dull drill. Displays are provided to indicate Torque, Thrust, RPM, Inches of travel per revolution and relative displacement of the drill. These displays are used for the manual control of the drill. Torque, Thrust, RPM and absolute displacement information is supplied to a computer for the automatic operation of the hydraulic drill. Since optimized speeds and feeds are generally known for specific drill diameters and materials, this information has been programmed into the computer to provide the command feed and command speed levels for the various materials in a stack to provide the error signals for controlling the feed and speed servo valves. Torque and Thrust buildup are used by the computer for indications of chip packing or dull drill. Four solenoid valves are used to provide rapid advancement and rapid retraction of the drill.

6 Claims, 17 Drawing Figures

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JAT 00103





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**United States Patent** [19]

**Dion**

[11] **4,156,878**

[45] **May 29, 1979**

**[54] WIDEBAND WAVEGUIDE LENS**

[75] Inventor: **Andre R. Dion, Concord, Mass.**

[73] Assignee: **The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

[21] Appl. No.: **872,203**

[22] Filed: **Jan. 25, 1978**

[51] Int. Cl.<sup>2</sup> ..... **H01Q 15/04**

[52] U.S. Cl. .... **343/909**

[58] Field of Search ..... **343/753, 754, 755, 909, 343/910, 854**

**[56] References Cited**

**U.S. PATENT DOCUMENTS**

2,607,009	8/1952	Affel	343/753
3,049,708	8/1962	Berkowitz	343/753
3,833,909	9/1974	Schaeffelberger	343/754

**FOREIGN PATENT DOCUMENTS**

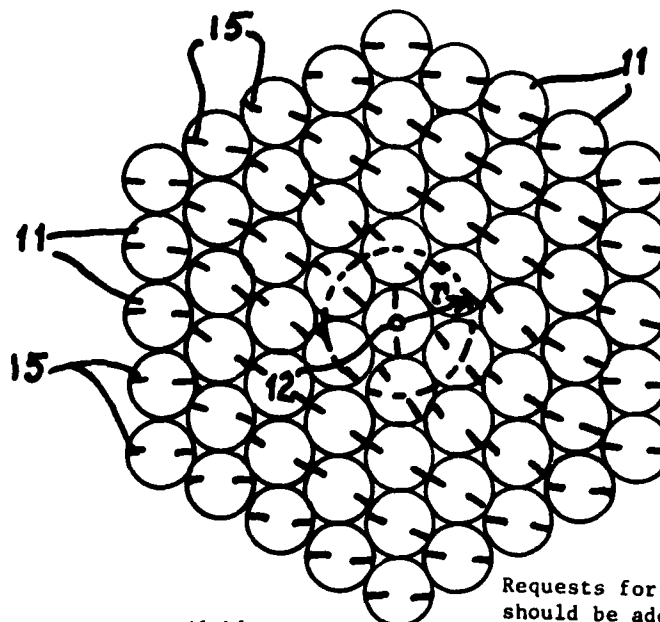
838333 5/1952 Fed. Rep. of Germany ..... 343/909

*Primary Examiner*—Eli Lieberman  
*Attorney, Agent, or Firm*—Joseph E. Rusz; Willard R. Matthews, Jr.

**[57] ABSTRACT**

A waveguide lens having improved efficiency and bandwidth characteristics is realized by appropriately combining the waveguide element array configuration of a conventional zoned waveguide lens with the phase shifting means of a constant thickness variable phase shift type waveguide lens. The length of each waveguide element and the phase shift required of its phase shifting means are functions of the waveguide elements radial distance from the lens axis. Design equations for determining waveguide element length and phase shift values are developed using both single and double frequency design procedures.

**2 Claims, 10 Drawing Figures**



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# PATENT ABSTRACT

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## United States Patent [19]

Jones

[11] 4,156,514

[45] May 29, 1979

### [54] CYLINDER SUPPORT ASSEMBLY

[75] Inventor: Larry R. Jones, Norwalk, Calif.  
[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 889,468

[22] Filed: Mar. 23, 1978

[51] Int. Cl.<sup>2</sup> ..... E21F 17/02

[52] U.S. Cl. .... 248/58; 248/62

[58] Field of Search ..... 248/54 R, 58, 60, 62,  
248/74 R, 74 A, 74 B, 358 A

### [56] References Cited

#### U.S. PATENT DOCUMENTS

285,748	9/1883	Gulick	248/62
1,187,587	6/1916	White	248/62
2,489,481	11/1949	Chester	248/54 R
3,141,642	7/1964	Mayrath	248/74 B

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1299471	7/1969	Fed. Rep. of Germany	248/62
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1375626	9/1964	France	248/358 A
303429	8/1968	Sweden	248/358 A

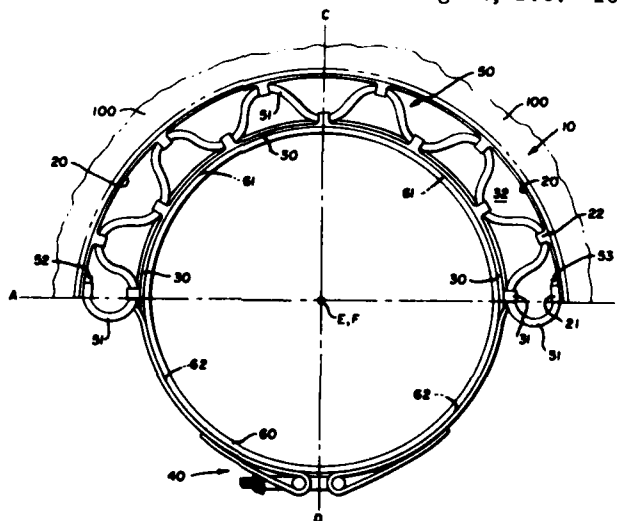
Primary Examiner—Robert A. Haber  
Attorney, Agent, or Firm—Joseph E. Rusz; Arsen Tashjian

### ABSTRACT

[57] The assembly releasably holds a hollow cylinder, or the like, from an overhead support in a stable condition, even during and after the hanging cylinder has expanded lengthwise. The preferred embodiment of the assembly includes: a first half-ring shaped member of sheet metal attached to the overhead support; a second half-ring shaped member of sheet metal disposed along, and in abutting contact with, the upper external surface of, the cylinder; a band clamp encircling and clamping the second half-ring member to the cylinder; and, a wire rope cable that is connected alternately, and recurringly, to the first and second half-ring members. The assembly is simple in structure, light in weight, and inexpensive to fabricate and to install.

### 2 Claims, 4 Drawing Figures

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# PATENT ABSTRACT

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## United States Patent [19]

Hilliard, Jr. et al.

[11] 4,159,497

[45] Jun. 26, 1979

### [54] SWITCH DEBOUNCE CIRCUIT

[75] Inventors: Milton E. Hilliard, Jr., Millers;  
Daniel J. Provine, Severna Park,  
both of Md.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 880,910

[22] Filed: Feb. 23, 1978

[51] Int. Cl.<sup>2</sup> ..... H02H 7/20

[52] U.S. Cl. .... 361/2; 307/247 A

[58] Field of Search ..... 361/2; 307/247 A

### [56] References Cited

#### U.S. PATENT DOCUMENTS

2,864,007	12/1958	Clapper	307/247 A
3,866,092	2/1975	Burns	361/2
4,045,692	8/1977	Morokawa et al.	307/247 A X

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1900 Half Street S.W.  
Washington, D.C. 20324

Primary Examiner—Harry E. Moose, Jr.

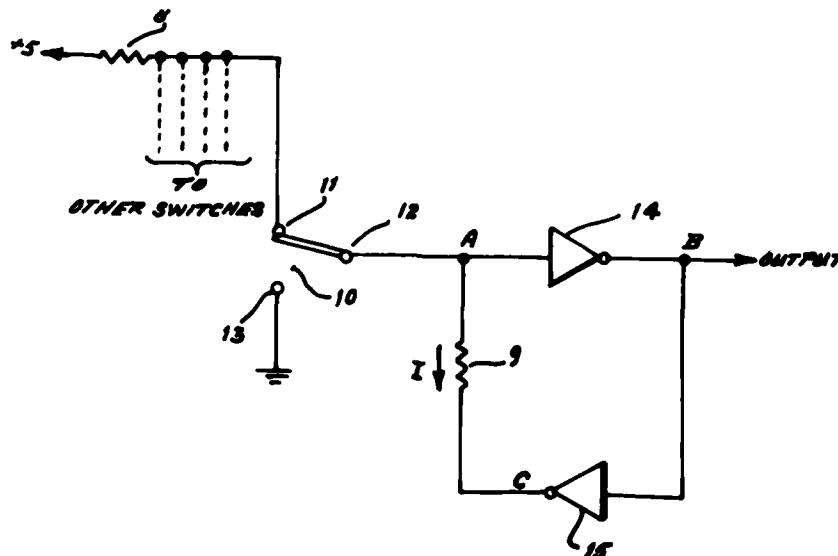
Attorney, Agent, or Firm—Joseph E. Ruzs; George Fine

### [57] ABSTRACT

A switch debounce circuit buffers the mechanical contacts of a double throw single pole switch into digital logic. It is essentially an active debounce circuit requiring only one wire from the switch to the circuit. The circuit includes a pair of oppositely connected inverting logic amplifiers with a resistor coupled between the output of one amplifier and the input of the second amplifier. The input from the switch is connected to the same leg of the circuit as a resistor and the output is taken from an opposite leg connecting the output of the second amplifier to the input of the first amplifier. The propagation of logic signals is effected by changing the state of the switch but contact bounce does not effect the logic.

2 Claims, 1 Drawing Figure

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**United States Patent** [19]

Butler et al.

[11] **4,161,041**

[45] **Jul. 10, 1979**

[54] **PSEUDO RANDOM NUMBER GENERATOR APPARATUS**

[75] **Inventors:** Eric W. Butler, Severna Park;  
Clinton W. Moulde, III, Millersville,  
both of Md.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 949,190

[22] **Filed:** Oct. 6, 1978

[51] **Int. Cl.<sup>2</sup>** ..... G11C 13/00

[52] **U.S. Cl.** ..... 365/244; 365/73

[58] **Field of Search** ..... 365/244, 78, 73, 76,  
365/77

**Primary Examiner**—Terrell W. Fears  
**Attorney, Agent, or Firm**—Joseph E. Ruzs; William  
Stephanishen

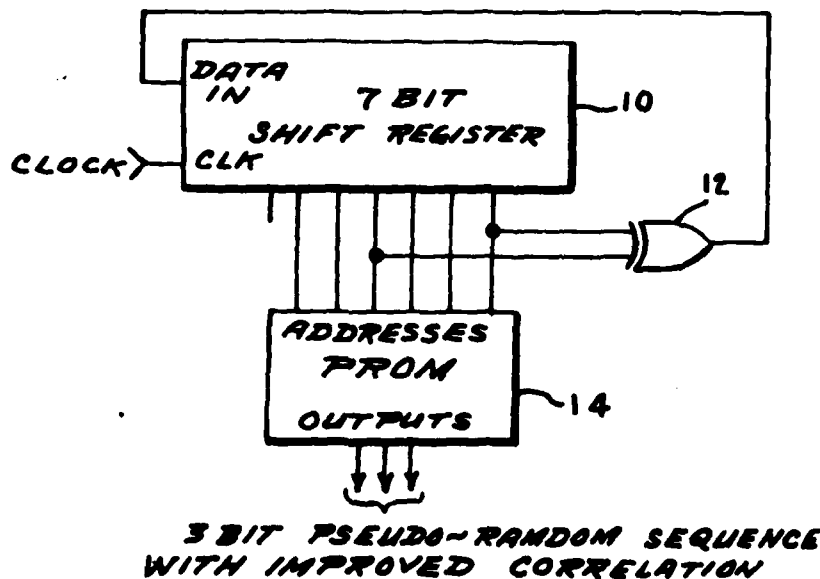
[57] **ABSTRACT**

An improved pseudo random number generator apparatus utilizing a programmable read only memory to reduce autocorrelation magnitudes by mapping the maximal length shift register states into the final output states.

7 Claims, 9 Drawing Figures

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**United States Patent** [19]

[11] **4,161,434**

**Quinlan et al.**

[45] **Jul. 17, 1979**

[54] **METHOD FOR SEPARATING  
TRIALUMINUM NICKELIDE FIBERS FROM  
AN ALUMINUM MATRIX**

[75] **Inventors:** Kenneth P. Quinlan, Newton; Joseph  
J. Hutta, Groton, both of Mass.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 930,658

[22] **Filed:** Oct. 12, 1978

[51] **Int. Cl.<sup>2</sup>** ..... C25F 5/00; C25F 3/00;  
C25F 3/04

[52] **U.S. Cl.** ..... 204/146; 204/129.8

[58] **Field of Search** ..... 204/146, 129.75, 140,  
204/141.5, 129.8

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

3,002,908	10/1961	Hall	204/146
3,254,011	5/1966	Zaremaki	204/129.8
3,615,900	10/1971	Lee	204/146
4,100,044	7/1978	Hussey et al.	204/146

**OTHER PUBLICATIONS**

Transactions of the Metallurgical Society of Aime, vol.  
239, Jun. 1967, p. 845.  
Transactions of the Metallurgical Society of Aime, vol.  
233, Feb. 1965, p. 335.

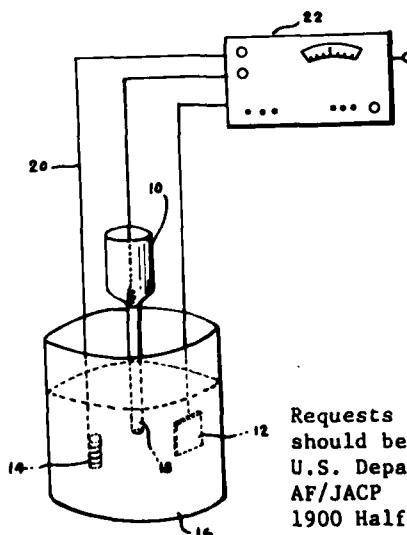
*Primary Examiner*—T. M. Tufariello  
*Attorney, Agent, or Firm*—Joseph E. Ruzs; William J.  
O'Brien

[57] **ABSTRACT**

Electrolytic production of  $Al_3Ni$  fibers using a potas-  
sium hydroxide electrolyte.

**3 Claims, 3 Drawing Figures**

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**United States Patent** [19]

Hutta et al.

[11] **4,161,826**

[45] **Jul. 24, 1979**

[54] **METHOD OF DEAGGLOMERATION OF ALUMINUM POWDER**

[75] Inventors: **Joseph J. Hutta, Groton; Kenneth P. Quinlan, Newton, both of Mass.**

[73] Assignee: **The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

[21] Appl. No.: **884,881**

[22] Filed: **Mar. 9, 1978**

[51] Int. Cl.<sup>2</sup> ..... **F26B 7/00**

[52] U.S. Cl. .... **34/12; 34/9**

[58] Field of Search ..... **34/9, 12**

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1900 Half Street S.W.  
Washington, D.C. 20324

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

1,674,230 6/1928 Seyffert ..... 34/9

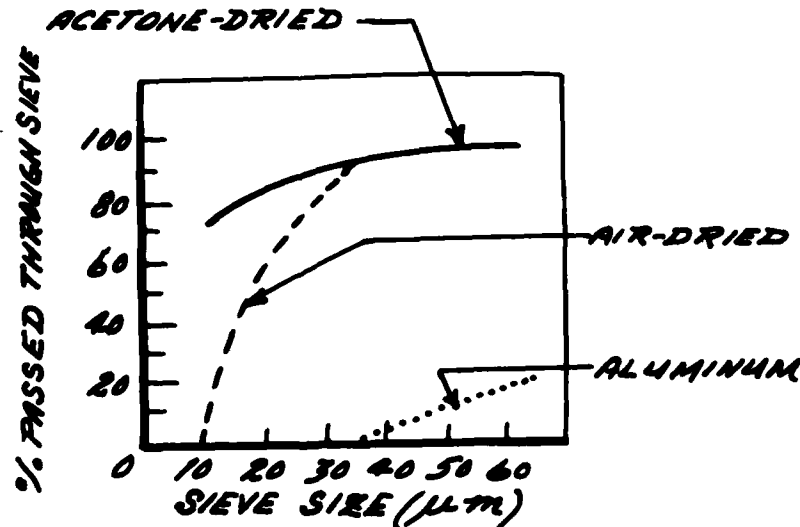
Primary Examiner—John J. Camby  
Attorney, Agent, or Firm—Joseph E. Ruz; William J. O'Brien

[57] **ABSTRACT**

A method for deagglomerating finely divided aluminum metal powders by allowing said metals powders to remain in contact with water heated to room temperature for approximately 30 hours.

**2 Claims, 1 Drawing Figure**

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**United States Patent** [19]

**Specker et al.**

[11] **4,161,874**

[45] **Jul. 24, 1979**

[54] **HEAD AND NECK IMPACT  
MEASUREMENT SYSTEM**

[75] **Inventors:** Lawrence J. Specker, Dayton, Ohio;  
Annie M. Higgins, Lexington, Ky.;  
James W. Brinkley, Kettering, Ohio

[73] **Assignee:** The United States of America, as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 932,071

[22] **Filed:** Aug. 8, 1978

[51] **Int. Cl.:** G01M 7/00; G01P 15/00

[52] **U.S. Cl.:** 73/12; 73/432 SD

[58] **Field of Search:** 73/12, 432 SD, 663

[56] **References Cited**

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3,841,163 10/1974 Daniel ..... 73/432 SD

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AF/JACP

1900 Half Street S.W.  
Washington, D.C. 20324

*Primary Examiner—James J. Gill*

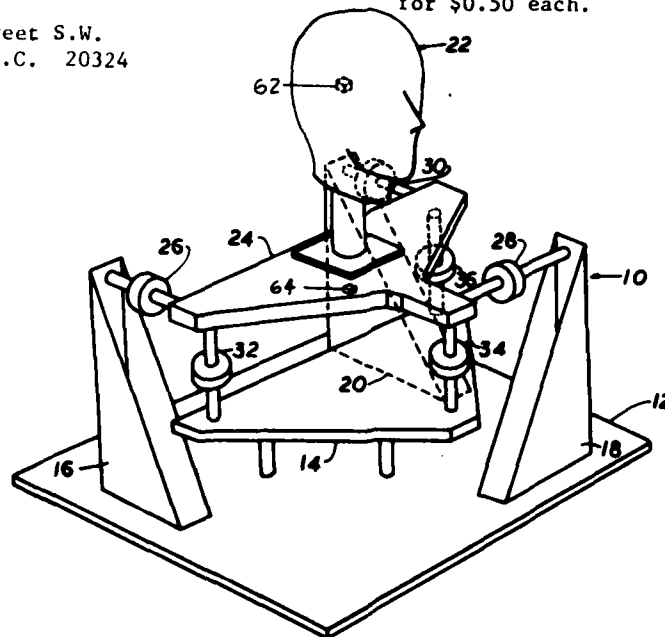
*Attorney, Agent, or Firm—Joseph E. Rusz; Richard J.  
Killoren*

[57] **ABSTRACT**

A system for measuring head and neck impact forces, having a movable plate member with an anthropometric dummy head and neck member secured to the plate member. Three force measuring cells are positioned in a horizontal plane and are connected between the movable plate member and three column members. Three vertical force measuring cells are positioned between a support plate and the movable plate member. High frequency response triaxial accelerometers are mounted at the center of gravity of the dummy head and neck member and on the movable plate member adjacent the attachment of the dummy head and neck member.

**2 Claims, 4 Drawing Figures**

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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,162,203**

**Eden et al.**

[45] **Jul. 24, 1979**

**[54] METHOD OF MAKING A NARROW-BAND  
INVERTED HOMO-HETEROJUNCTION  
AVALANCHE PHOTODIODE**

[75] Inventors: **Richard C. Eden**, Thousand Oaks;  
**Kenichi Nakano**, N. Hollywood, both  
of Calif.

[73] Assignee: **The United States of America as  
represented by the Secretary of the  
Air Force**, Washington, D.C.

[21] Appl. No.: **920,741**

[22] Filed: **Jun. 28, 1978**

**Related U.S. Application Data**

[62] Division of Ser. No. 808,496, Jun. 21, 1977, Pat. No.  
4,110,778.

[51] Int. Cl.<sup>2</sup> ..... **H01L 31/18**

[52] U.S. Cl. .... **204/38 R; 204/38 B;  
204/192 D; 427/74; 427/85; 427/87; 29/572**

[58] Field of Search ..... **204/38 R, 38 B, 192 D;  
427/74, 85, 86, 87, 88, 82; 29/572; 357/13, 16,  
30**

**[56] References Cited**

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**OTHER PUBLICATIONS**

Silicon Nitride Films by Direct RF Sputter Deposition,  
G. J. Kominak, J. Electrochem. Soc., Sep. 1975, pp.  
1272-1273.

*Primary Examiner*—John H. Mack

*Assistant Examiner*—William Leader

*Attorney, Agent, or Firm*—Joseph E. Ruzs; Casimer K.  
Salys

[57]

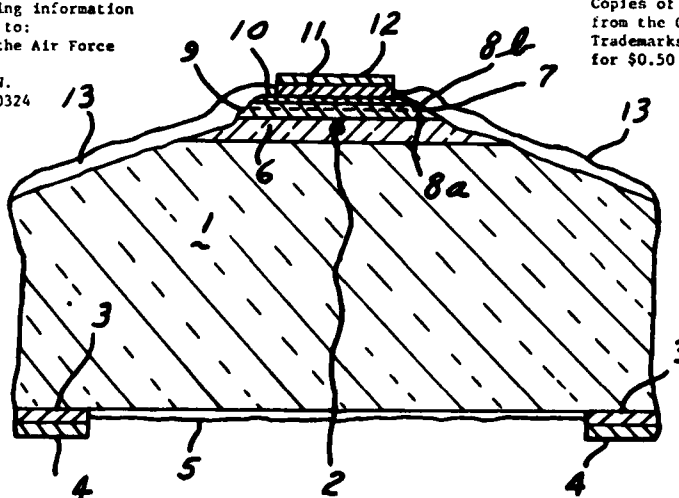
**ABSTRACT**

A narrow-band, inverted homo-heterojunction avalanche photodiode, configured in the shape of a mesa situated upon a substrate which is transparent to selected light energy wavelengths. The diode is inverted for operation such that the incoming light energy enters the substrate side, passes through a wavelength selective buffer layer and is absorbed upon entering the succeeding, active region. Avalanche gain is attained by drift from the area of absorption to the high field p-n homo-heterojunction located immediately thereafter. The device exhibits low levels of noise during operation because absorption is occurring in a low field region and because the ionization and breakdown noise associated with lattice mismatches is avoided through the formation of the p-n homo-heterojunction in one continuous growth process. Appropriate passivation of the mesa walls inhibits surface leakage and breakdown effects.

**2 Claims, 18 Drawing Figures**

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**United States Patent** [19]

**King**

[11] **4,162,222**

[45] **Jul. 24, 1979**

[54] **GREASE COMPOSITIONS**

[75] **Inventor:** James P. King, Upper Gwynedd Township, Montgomery County, Pa.

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 933,935

[22] **Filed:** Aug. 15, 1978

[51] **Int. Cl.:** C10M 1/48; C10M 3/42; C10M 1/44; C10M 3/38

[52] **U.S. Cl.:** 252/32.7 E; 252/32.5; 252/49.6

[58] **Field of Search:** 252/32.5, 32.7 E, 49.6

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

3,522,178 7/1970 Peschko et al. .... 252/32.5

*Primary Examiner*—Delbert E. Gantz

*Assistant Examiner*—Irving Vaughn

*Attorney, Agent, or Firm*—Joseph E. Ruess; Cedric H. Kuhn

[57] **ABSTRACT**

Grease compositions comprising a silicone fluid and a thickening amount of a poly(metal phosphinate) containing at least one XP(R) (HX) group, where X is oxygen or sulfur and R is alkyl or aryl.

**6 Claims, No Drawings**

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**United States Patent** [19]  
**Arnold et al.**

[11] **4,162,265**  
[45] **Jul. 24, 1979**

[54] **AROMATIC ENYNE COMPOUNDS AND  
THEIR SYNTHESIS**

[75] **Inventors:** Fred E. Arnold, Centerville; Bruce A. Reinhardt, New Carlisle; Frederick L. Hedberg, Xenia, all of Ohio

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 946,290

[22] **Filed:** Sep. 27, 1978

[51] **Int. Cl.<sup>2</sup>** ..... C07C 87/52; C07C 49/76;  
C07C 39/18

[52] **U.S. Cl.** ..... 260/578; 260/582;  
260/590 D; 528/171; 568/729

[58] **Field of Search** ..... 260/578, 590 D;  
568/729

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

2,586,487	2/1952	Schwartzman et al. ....	260/578 X
2,852,556	9/1958	Katz et al. ....	260/578 X
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3,624,162	11/1971	Sieber ..... 568/729	
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4,122,026	10/1978	Osman ..... 260/578 X	

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1534311 7/1968 France ..... 568/729

**OTHER PUBLICATIONS**

Shell Int., "French Patent Abstracts", vol. 6c13, 4:2 (1966).

Wessely et al., "Chem. Ab.", vol. 54, ab. 2229-2230 (1960).

*Primary Examiner*—Winston A. Douglas

*Assistant Examiner*—John Doll

*Attorney, Agent, or Firm*—Joseph E. Rusz; Cedric H. Kuhn

[57] **ABSTRACT**

Difunctional aromatic enyne compounds are prepared by the catalytic coupling of substituted monoethynyl compounds. The compounds are useful as monomers in polycondensation reactions for the preparation of high molecular weight, thermally stable thermoplastic polymers. On thermal treatment of the polymers, the enyne groups along the polymer backbones react by inter-chain reactions to provide the solvent and craze resistance required for application as structural materials.

**4 Claims, No Drawings**

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**United States Patent** [19]

[11] **4,162,292**

**Speeds et al.**

[45] **Jul. 24, 1979**

- [54] **HIGH PRESSURE HYDRAZINE GAS GENERATOR**  
[75] Inventors: John A. Speeds, San Jose, Costa Rica;  
Robert D. Marcy, Chatsworth, Calif.

3,298,182	1/1967	Webb	23/281 X
3,303,651	2/1967	Grant et al.	60/257 X
3,377,140	4/1968	Hall	23/281 X
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3,871,828	3/1975	Ellion et al.	23/281
4,069,664	1/1978	Ellion et al.	60/258

- [73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Primary Examiner—Barry S. Richman  
Attorney, Agent, or Firm—Joseph E. Rusz; Jacob N. Erlich

- [21] Appl. No.: 844,082

- [22] Filed: Oct. 20, 1977

- [51] Int. Cl.<sup>2</sup> B01J 7/02; F02C 3/24;  
F02K 7/08

- [52] U.S. Cl. 422/206; 60/39.46 M;  
422/49; 422/211; 422/236

- [58] Field of Search 23/281, 282; 60/257,  
60/258, 259, 260, 39.46 M; 422/236, 211, 206,  
49

- [56] References Cited

**U.S. PATENT DOCUMENTS**

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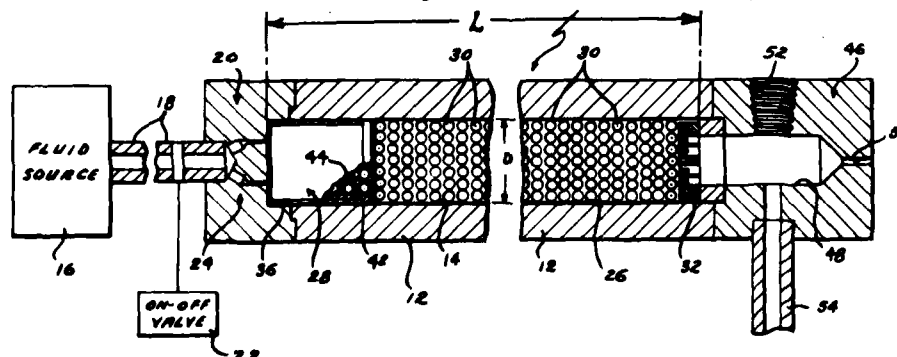
[57] **ABSTRACT**

A high pressure hydrazine gas generator having a decomposition chamber which contains therein an initiator of  $I_2O_5$  crystals and a plurality of heat retaining balls. The liquid hydrazine which is initially introduced into the decomposition chamber, ignites upon contact with the initiator and creates a high temperature within the decomposition chamber. This high temperature is maintained within the chamber by the heat retaining balls and therefore sustains decomposition of the liquid hydrazine into gases which are emitted from the generator under extremely high pressure.

**9 Claims, 2 Drawing Figures**

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United States Patent [19]

[11] 4,162,776

Sibley et al.

[45] Jul. 31, 1979

## [54] AERIAL PHOTOGRAPHY CAMERA MOUNT ASSEMBLY FOR A HELICOPTER

[76] Inventors: Clarence E. Sibley, HQ26TRW, Box 1331, APO New York, N.Y. 09860; Francisco C. Sablan, 13 Woodland Dr., Mary Esther, Fla. 32569

[21] Appl. No.: 877,936

[22] Filed: Feb. 15, 1978

[51] Int. Cl.<sup>2</sup> ..... B64D 47/08

[52] U.S. Cl. .... 244/118 R; 354/74

[58] Field of Search ..... 244/129.1, 129.5, 118 R, 244/137 R, 1 R, 136; 354/65, 74, 81, 113, 293, 294, 70; 89/37.5 R, 37.5 A, 37.5 D, 37.5 E; 33/1 A; 248/178, 187, 23, 346; 95/12.5

## [56] References Cited

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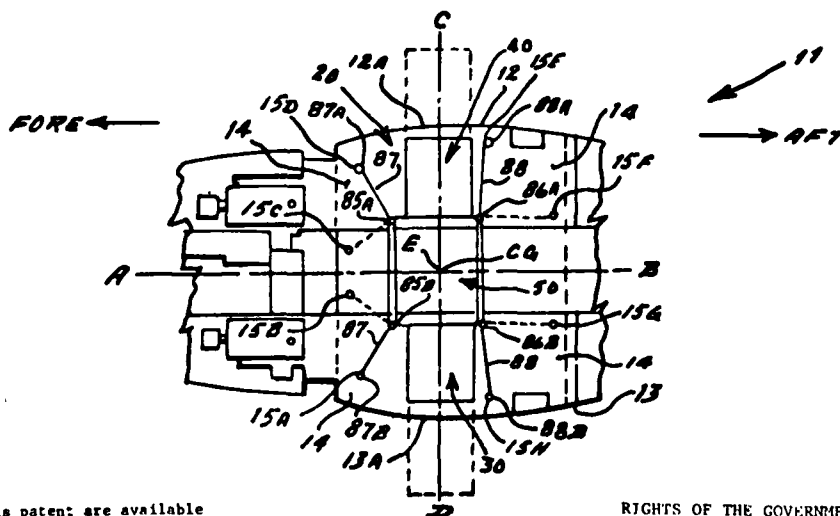
Primary Examiner—Galen L. Barefoot

Attorney, Agent, or Firm—Joseph E. Ruzs; Arsen Tashjian

## [57] ABSTRACT

An assembly for mounting, supporting, and releasably holding an angularly adjustable aerial photography camera that is to be used to take aerial reconnaissance photographs, while the assembly is detachably connected to the internal surface of a helicopter that is in stable flight and has an opening in each side. The assembly includes: a rectangular frame which carries the camera; another rectangular frame which carries ballast (i.e., a counterweight); and, a main frame to which the rectangular frames are releasably connected, and in which the frames are slidably movable in opposite directions simultaneously. In flight, the rectangular frames are simultaneously extended on each side of the center of gravity, and of the longitudinal centerline, of the helicopter, and through the opposite openings in the helicopter, with the camera extending out of one of the openings, and with the counterweight extending out of the other opening. This symmetrical loading, and the resultant continued stability of the helicopter in flight, permit the taking of the aerial photographs with the camera.

8 Claims, 17 Drawing Figures



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## United States Patent [19]

Gilbert, III et al.

[11] 4,162,777

[45] Jul. 31, 1979

[54] CANTED SPAR WITH INTERMEDIATE  
INTERCOSTAL STIFFENERS

[75] Inventors: William W. Gilbert, III; Eduardo W.  
Gomez, both of Fort Worth, Tex.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 902,131

[22] Filed: May 2, 1978

[51] Int. Cl.<sup>2</sup> ..... B64C 3/22

[52] U.S. Cl. .... 244/123; 52/84;  
416/226

[58] Field of Search ..... 244/123, 124; 52/84;  
428/119, 120; 416/226, 229 R, 233

[56] References Cited

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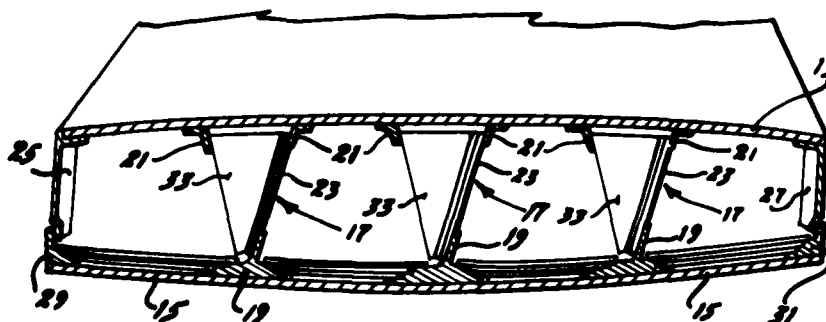
Primary Examiner—Barry L. Kelmachter  
Attorney, Agent, or Firm—Joseph E. Rusz; Arsen  
Tashjian

### [57] ABSTRACT

An aircraft wing box construction including canted sheet metal spar webs continuously tied to the upper and lower skins. Sheet metal intercostal stiffeners of substantially triangular configuration are spaced spanwise along the web to provide shear stiffening for the web and intermittent stabilization for the upper skin. Both the shear web and intercostal stiffeners are fastened to spanwise continuous spar caps which are attached to the upper and lower skins. These caps, supported by the intercostals and webs, provide sufficient stabilization to prevent upper skin buckling up to ultimate design stress with a minimum of shear webs thereby providing significant weight savings.

3 Claims, 5 Drawing Figures

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**United States Patent** [19]  
**Martin**

[11] **4,162,818**  
[45] **Jul. 31, 1979**

[54] **INTERCONNECTION FOR PLANAR  
ELECTRONIC CIRCUITS**

[75] **Inventor:** Jacob H. Martin, Wellesley, Mass.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 865,268

[22] **Filed:** Dec. 28, 1977

[51] **Int. Cl.<sup>2</sup>** ..... H01R 13/00

[52] **U.S. Cl.** ..... 339/112 R; 339/17 M

[58] **Field of Search** ..... 339/112 R, 113 B, 17 M,  
339/17 R, 17 CF

[56]

## References Cited

### U.S. PATENT DOCUMENTS

4,045,105 8/1977 Lee et al. .... 339/17 CF

*Primary Examiner*—Roy Lake

*Assistant Examiner*—DeWalden W. Jones

*Attorney, Agent, or Firm*—Joseph E. Ruzs; Henry S.  
Miller

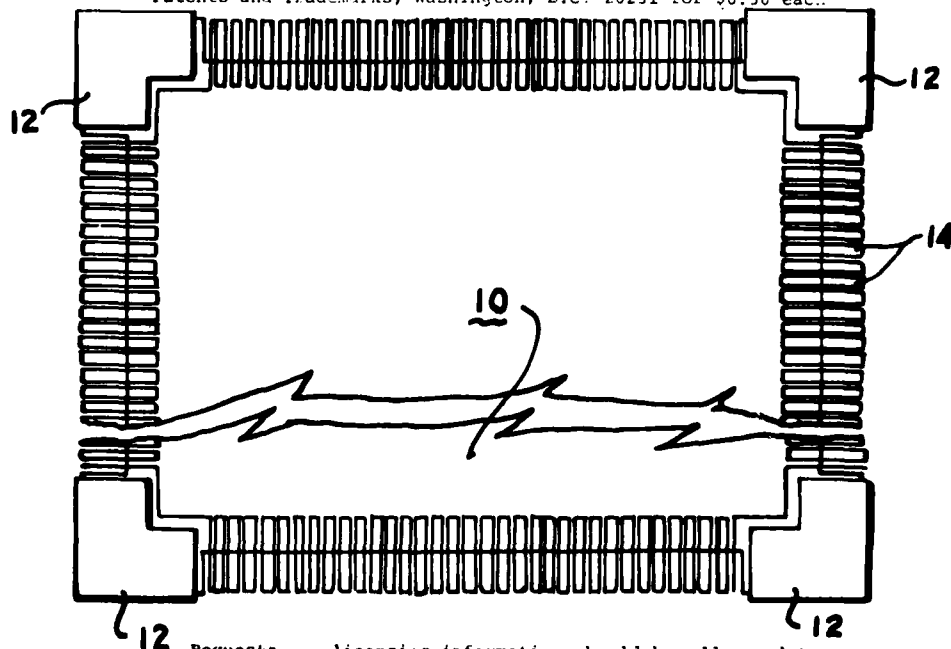
[57]

## ABSTRACT

A circuit board with connectors along more than one  
side designed to be stacked with similar boards, having  
a plurality of electrical contacts to connect to a connec-  
tor header with resilient contacts, applying a force to  
the circuit board which is inclined from a central axis  
whereby the circuit board and the connector header  
join in a tight, reliable compression contact.

**6 Claims, 3 Drawing Figures**

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**United States Patent** [19]

[11] **4,163,629**

**McDonough et al.**

[45] **Aug. 7, 1979**

[54] **TURBINE VANE CONSTRUCTION**

[56] **References Cited**

## U.S. PATENT DOCUMENTS

[75] **Inventors:** Edward C. McDonough,  
Lawrenceburg, Ind.; Eugene N.  
Tuley, Hamilton, Ohio

2,807,433	9/1957	Halford et al.	415/137
3,075,744	1/1963	Peterson	415/137
3,240,468	3/1966	Watts et al.	415/115
3,558,237	1/1971	Wall	415/115

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

**Primary Examiner**—Louis J. Casaregola  
**Attorney, Agent, or Firm**—Joseph E. Ruz; Richard J.  
Killoren

[21] **Appl. No.:** 864,049

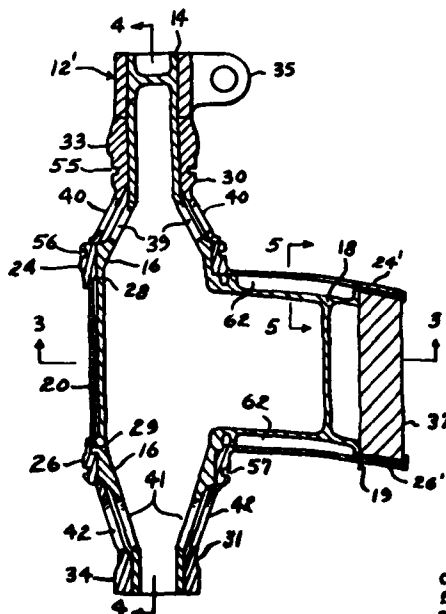
[57] **ABSTRACT**

[22] **Filed:** Dec. 23, 1977

A variable area turbine vane, for use in high temperature aircraft gas turbines, having a load carrying spar with a heat shield member surrounding the load carrying member. The heat shield member is positioned in grooves which permit spanwise and cordwise expansion of the heat shield member. Cooling air enters the hollow load bearing member and passes through holes in the load bearing member and heat shield member.

[51] **Int. Cl.** F01D 25/12; F02C 7/18  
[52] **U.S. Cl.** 415/115; 415/137  
[58] **Field of Search** 415/115, 116, 117, 136,  
415/137, 160; 416/96 A, 97 A

**2 Claims, 6 Drawing Figures**

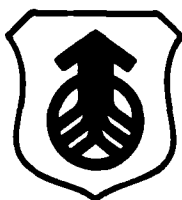


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United States Patent [19]

[11]

4,163,973

Jacobson, Jr.

[45]

Aug. 7, 1979

[54] MEANS FOR DEVELOPING A RADAR  
TRACKING ERROR SIGNAL

[75] Inventor: Robert E. Jacobson, Jr., Los  
Angeles, Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 549,402

[22] Filed: Feb. 18, 1975

[51] Int. Cl.: G01S 9/22

[52] U.S. Cl.: 343/16 M

[58] Field of Search: 343/16 M

[56] References Cited

## U.S. PATENT DOCUMENTS

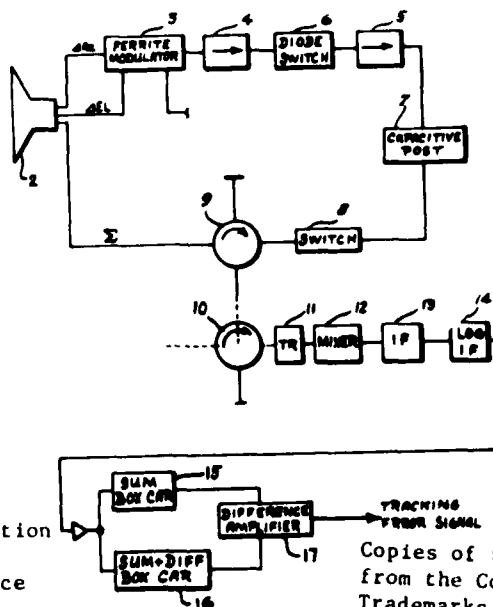
3,229,287 1/1966 Hovda 343/16 M  
3,579,239 5/1971 Purcell et al. 343/16 M

Primary Examiner—T. H. Tubbesing  
Attorney, Agent, or Firm—Joseph E. Rusz; Willard R.  
Matthews, Jr.

[57] ABSTRACT

A tracking radar error signal that is independent of pulse to pulse variations of amplitude of the received signal is derived by combining separately detected sum signal energy and difference signal energy in a manner that provides composite error signal pulses that are one-half sum signal energy and one-half sum plus difference signal energy. The pulse composition is realized by means of an RF switch that interrupts the difference signal during approximately one-half of each pulse period. The composite error signal is detected by an IF logarithmic detector and subsequently processed by two parallel box car generators. One box car generator is gated to process sum signal energy and the other is gated to process sum plus difference signal energy. The tracking error signal is obtained from a single pulse by feeding the outputs of the two box car generators to a differential amplifier and obtaining the difference voltage at its output.

1 Claim, 1 Drawing Figure



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JAT 00119





# PATENT ABSTRACT

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## United States Patent [19]

Schuermeier et al.

[11] 4,163,985

[45] Aug. 7, 1979

- [54] **NONVOLATILE PUNCH THROUGH MEMORY CELL WITH BURIED N+ REGION IN CHANNEL**
- [75] Inventors: Fritz L. Schuermeier, Yellow Springs; Charles R. Young, Xenia, both of Ohio
- [73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
- [21] Appl. No.: 838,437
- [22] Filed: Sep. 30, 1977
- [51] Int. Cl.<sup>2</sup> ..... H01L 29/78
- [52] U.S. Cl. .... 357/23; 357/13; 357/54; 357/59; 307/238; 365/184
- [58] Field of Search ..... 365/184; 357/23, 54, 357/13, 59; 307/238

3,936,857	2/1976	Ota	357/23
3,996,657	12/1976	Simko et al.	357/23
4,000,504	12/1976	Berger	357/23
4,010,482	3/1977	Abbas et al.	357/23
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4,062,037	12/1977	Togei et al.	357/23

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J. Verwey et al., "Atmos-An electrically Reprogrammable Read-only Memory Device," IEEE Transon Elec. Dev., vol. ED-21#10, Oct. 1974, pp. 631-635.

W. Johnson, "Multiple Masking Technique in Ion Implantation," IBM Tech. Discl. Bull., vol. 15#2, Jul. 1972, pp. 660-661.

Primary Examiner—Joseph E. Clawson, Jr.  
Attorney, Agent, or Firm—Joseph E. Rusz; Robert Kern Duncan

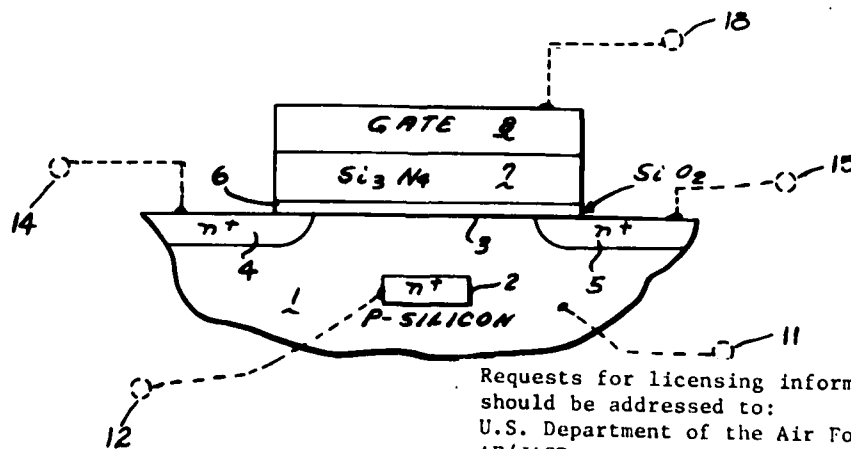
### [57] ABSTRACT

A nonvolatile memory cell is disclosed that has a buried n+ layer from which charge (electrons) is injected into the insulator of n-channel MNOS (Metal Nitride Oxide Semiconductor) type devices.

3 Claims, 6 Drawing Figures

- [56] **References Cited**
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- |           |         |               |        |
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## United States Patent [19]

[11] 4,164,741

Schmidt

[45] Aug. 14, 1979

[54] DECEPTION CIRCUITRY FOR AUTOMATIC  
RANGE GATE TRACKING IN FIRE  
CONTROL RADAR

[75] Inventor: Jerry D. Schmidt, Enon, Ohio

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 761,891

[22] Filed: Sep. 13, 1968

[51] Int. Cl.<sup>2</sup> ..... G01S 7/38

[52] U.S. Cl. .... 343/18 E

[58] Field of Search ..... 343/18 E; 328/58

[56] References Cited

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3,971,021 7/1976 Cann ..... 343/18 E  
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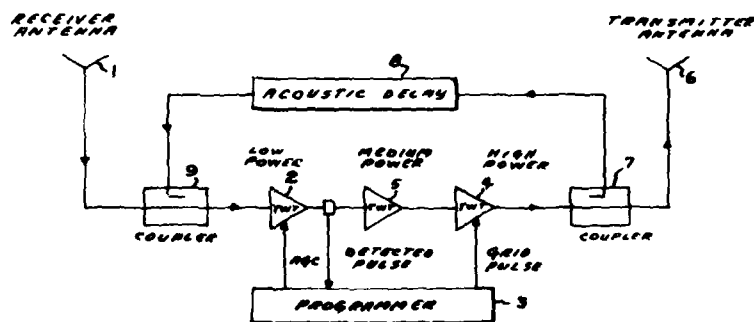
Primary Examiner—T. H. Tubbesing  
Attorney, Agent, or Firm—Joseph E. Ruzs; Robert Kern  
Duncan

### [57] ABSTRACT

An acoustic delay line is used in a feed-back loop in the traveling wave tube repeater chain of an electronic countermeasures system to provide a wider transmitted pulse (than the pulse received by the ECM system) resulting in range gate deception in an opposing tracking radar.

4 Claims, 3 Drawing Figures

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AFSC FORM 79c  
SEP 78

R&D RECORD (Patent Abstract)

JAT 00121

AFSC — Andrews AFB Md 1978



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## United States Patent [19]

Paciorek et al.

[11] 4,166,071

[45] Aug. 28, 1979

### [54] MONOPHOSPHA-S-TRIAZINES

[75] Inventors: **Kazimiera L. Paciorek**, Corona del Mar; **Reinhold H. Kratzer**; **Jacquelyn Kaufman**, both of Costa Mesa; **Thomas I. Ito**, Fountain Valley, all of Calif.

[73] Assignee: **The United States of America as represented by the Secretary of the Air Force**, Washington, D.C.

[21] Appl. No.: 865,271

[22] Filed: Dec. 28, 1977

[51] Int. Cl.<sup>2</sup> ..... C10M 1/44; C07F 9/22; C07F 9/65

[52] U.S. Cl. .... 260/551 P; 252/49.9; 252/400 A

[58] Field of Search ..... 260/551 P, 543 P

[56] References Cited

### U.S. PATENT DOCUMENTS

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Schoening et al., CA 86:171396p, (1977).  
Kukhar et al., CA 85:192681x, (1976).  
Kukhar et al., CA 82:4216r, (1975).

Primary Examiner—Thomas Waltz  
Attorney, Agent, or Firm—Joseph E. Ruzs; William J. O'Brien

### [57] ABSTRACT

A method for synthesizing monophospha-s-triazines by effecting a reaction between an amidoylamidine and a trihalo-phosphorane.

5 Claims, No Drawings

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JAT 00122



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**United States Patent** [19]

**Leavitt**

[11] **4,166,416**

[45] **Sep. 4, 1979**

[54] **OBTURATING SPLIT DISC**

[75] **Inventor:** Lealand F. Leavitt, Ogden, Utah  
[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 908,949

[22] **Filed:** Apr. 28, 1978

[51] **Int. Cl.:** F42B 25/20

[52] **U.S. Cl.:** 102/2

[58] **Field of Search:** 102/2-4,  
102/223, 225, 263, 1 R

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

2,364,197 12/1944 Dec 102/2

**Primary Examiner**—Charles T. Jordan  
**Attorney, Agent, or Firm**—Joseph E. Ruzs; Arsen  
Tashjian

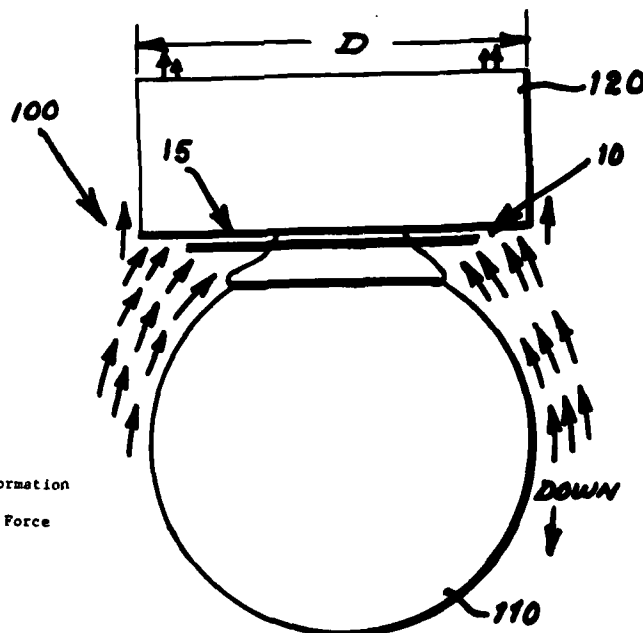
[57] **ABSTRACT**

A structural improvement to, and a method of improving, an air-dropped spin-actuated bomb of the anti-personnel type. The structural improvement comprises a split flexible polyethylene obturating disc which replaces the prior art rigid metal obturating disc used on these bombs. The improved disc is releasably connected to the bomb, whereas the prior art disc is fixedly attached to the bomb. The method comprises the step of disposing and releasably connecting the split flexible polyethylene obturating disc to the bomb at a location between the forward body section of the bomb and the aft fin section thereof. The result of the use of the structural improvement, and of the improvement method, is that the arming of the bomb is delayed, so that the bomb, which could only be safely air-dropped from a low speed aircraft, now can also be air-dropped from a high speed, or a very high speed, aircraft.

**4 Claims, 3 Drawing Figures**

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**United States Patent** [19]  
**McGraw**

[11] **4,166,445**  
[45] **Sep. 4, 1979**

[54] **LOW COST SOLAR COLLECTOR**

[76] **Inventor:** Thomas F. McGraw, 7538 Axton St.,  
Springfield, Va. 22151

[21] **Appl. No.:** 866,188

[22] **Filed:** Dec. 30, 1977

[51] **Int. Cl.:** F24J 3/02

[52] **U.S. Cl.:** 126/432; 126/449

[58] **Field of Search:** 126/270, 271; 237/1 A;  
165/104, 107

[56] **References Cited**  
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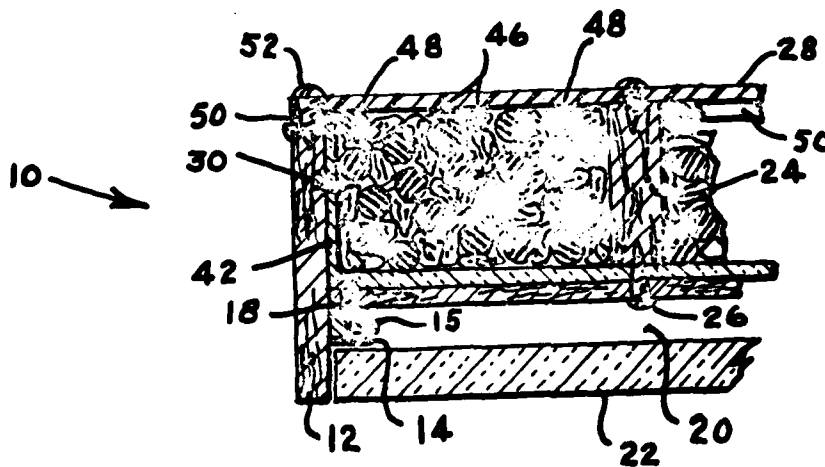
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4,067,316	1/1978	Brin et al.	126/271
4,082,082	4/1978	Harvey	126/271
4,112,921	9/1978	MacCracken	126/271

**Primary Examiner**—James C. Yeung  
**Attorney, Agent, or Firm**—Joseph E. Ruzs; Jacob N. Erlich

[57] **ABSTRACT**

A solar collector having a frame-like wooden housing which contains therein heat absorbing material in the form of pellets of coal or "diced" automobile tires. This material is sealed within the housing by a transparent cover. The resultant sealed container allows a flow of working fluid to pass therethrough by way of a pair of perforated pipes. The collector is oriented to receive maximum solar radiation in order to heat the heat absorbing material. The working fluid which flows in contact with the heat absorbing material, absorbs heat therefrom, and, by means of a circulating system which is not part of the invention is generally carried to a storage tank or the like for use at a later time.

10 Claims, 4 Drawing Figures



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JAT 00124



# PATENT ABSTRACT

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**United States Patent** [19]  
**Seifert et al.**

[11] **4,166,597**  
[45] **Sep. 4, 1979**

[54] **STOWABLE AND INFLATABLE VEHICLE**

[75] **Inventors:** Clair F. Seifert, Newport Beach;  
Harvey S. Seogy, Manhattan Beach;  
Thorvald K. Petersen, Santa Monica,  
all of Calif.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 468,702

[22] **Filed:** May 9, 1974

[51] **Int. Cl.:** B64G 1/00

[52] **U.S. Cl.:** 244/160; 244/158;

244/163

[58] **Field of Search:** 244/158, 159, 160, 163

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

3,220,004 11/1965 Gillespie, Jr. 244/158  
3,405,886 10/1968 Gosnell et al. 244/158

**Primary Examiner—Charles T. Jordan**

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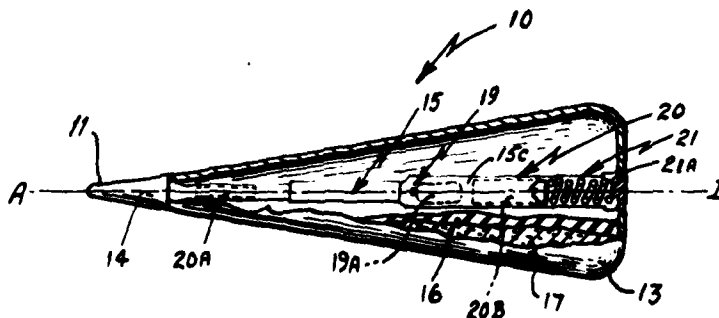
**Attorney, Agent, or Firm—Joseph E. Rusz; Arsen  
Tashjian**

[57] **ABSTRACT**

A stowable and inflatable vehicle, adapted for use as a  
decoy space vehicle and as a replica of a relatively hot  
parent space vehicle. In addition to other components,  
the inventive decoy and replica vehicle includes: a tele-  
scoping central tubular member that provides a rigid  
support and means for telescoping which aids in stow-  
ing the replica inventive vehicle; an inflatable structure  
which forms an external shape; and, a heater blanket in  
the outer layers of the structure to simulate the surface  
temperature of the parent vehicle. As a matter of prefer-  
ence, and in this adaptation, the inventive replica space  
vehicle is of a conical external configuration. The capa-  
bility of this inventive vehicle to be inflated to the de-  
sired external shape, rather than to assume the external  
shape by use of solely mechanical expanding means,  
provides superior structural integrity, and also permits a  
significant reduction in external dimensions and easy  
storage, even where stiff materials (which are difficult  
to fold and to unfold) must be, or preferably are, used.

**7 Claims, 3 Drawing Figures**

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JAT 00125



# PATENT ABSTRACT

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## United States Patent [19]

Seifert et al.

[11] 4,166,598

[45] Sep. 4, 1979

### [54] VEHICLE ENSHROUDING APPARATUS

[75] Inventors: Clair F. Seifert, Newport Beach;  
Harvey S. Seapy, Manhattan Beach;  
David E. Dunlap, Mission Viejo, all  
of Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 474,479

[22] Filed: May 30, 1974

[51] Int. Cl.<sup>2</sup> ..... B64G 1/00

[52] U.S. Cl. .... 244/160; 244/158;

244/163

[58] Field of Search ..... 244/158-160,  
244/163; 102/105

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,220,004 11/1965 Gillespie, Jr. .... 244/158  
3,405,886 10/1968 Gosnell et al. .... 244/158

Primary Examiner—Charles T. Jordan  
Attorney, Agent, or Firm—Joseph E. Rusz; Arsen  
Tashjian

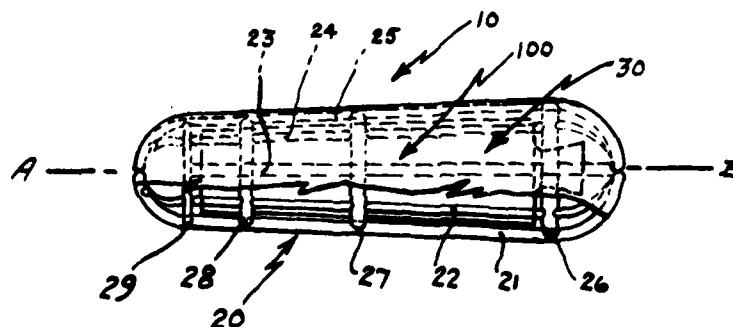
### [57]

### ABSTRACT

Stowable and inflatable apparatus for enshrouding a vehicle. The apparatus, in its most generic and most basic embodiment, includes an inflatable framework external of which is attached a multilayer superinsulating blanket shroud. The inflatable tubular framework includes a plurality of inflatable tubular-shaped longitudinal members in spaced-apart relationship, and a plurality of inflatable toroidal-shaped members also in spaced-apart relationship. Each of the toroidal-shaped members is positioned essentially perpendicular to, and in contact with, each of the tubular-shaped longitudinal members. The inventive apparatus solves the problems which are inherent in enclosing a large, relatively hot space vehicle to retain the heat therefrom, and in folding (and stowing) and in unfolding an apparatus in a space environment.

5 Claims, 2 Drawing Figures

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JAT 00126



# PATENT ABSTRACT

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## United States Patent [19]

Witucki et al.

[11] 4,168,273

[45] Sep. 18, 1979

### [54] METHOD FOR THE PREPARATION OF GLYCIDYL 2,2-DINITRO-2-FLUOROETHOXIDE

[75] Inventors: Edward F. Witucki, Van Nuys;  
Milton B. Frankel, Tarzana, both of  
Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 452,228

[22] Filed: Mar. 14, 1974

[51] Int. Cl.<sup>2</sup> ..... C07D 301/28

[52] U.S. Cl. .... 260/348.14; 149/19.3;  
149/88; 260/348.45

[58] Field of Search ..... 149/88; 260/348 R, 348.14,  
260/348.45

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,636,060	1/1972	Frankel et al.	260/348.14
3,652,600	3/1972	Grakauskas	260/348 R
3,784,420	1/1974	Frankel et al.	149/88 X

Primary Examiner—Leland A. Sebastian  
Attorney, Agent, or Firm—Joseph E. Rusz; William J.  
O'Brien

### [57] ABSTRACT

A method for synthesizing glycidyl 2,2-dinitro-2-2  
fluoroethoxide which comprises adding sodium hy-  
droxide to a reaction mixture of epibromohydrin and  
2,2-dinitro-2-fluoroethanol in the presence of carbon  
tetrachloride as a solvent for the reaction mixture.

1 Claim, No Drawings

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# PATENT ABSTRACT

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## United States Patent [19]

Covitt

[11] 4,168,470

[45] Sep. 18, 1979

### [54] TWO-BIT A/D CONVERSION APPARATUS WITHOUT A SIGNAL DERIVED AUTOMATIC GAIN CONTROL

[75] Inventor: Arthur L. Covitt, Sudbury, Mass.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 768,812

[22] Filed: Feb. 15, 1977

[51] Int. Cl.<sup>2</sup> ..... H03D 3/00; H03K 13/02;  
H04B 1/06

[52] U.S. Cl. .... 325/344; 329/112;  
340/347 AD; 340/347 M

[58] Field of Search .... 340/347 M, 347 SY, 347 AD;  
329/131, 112, 124; 328/171, 173; 325/414, 400,  
344-349; 331/12

### [56] References Cited

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3,983,499 9/1976 Tan ..... 331/12 X  
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I-26 to I-31.

Primary Examiner—Thomas J. Sloyan  
Attorney, Agent, or Firm—Joseph E. Ruzs; William  
Stepanishen

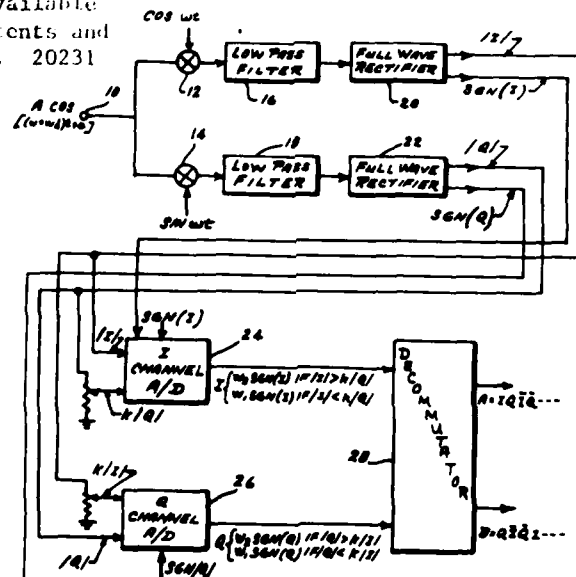
### [57] ABSTRACT

A two-bit analog to digital conversion apparatus for  
direct and instantaneous generation of digital signals  
which are independent of the absolute amplitude of the  
input signal envelope.

5 Claims, 1 Drawing Figure

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**P**ATENT  
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**United States Patent** [19]

**Black, Jr.**

[11] **4,168,473**

[45] **Sep. 18, 1979**

[54] **INTERNAL ARRESTER BEAM CLIPPER**  
[75] Inventor: **Maurice D. Black, Jr.**, Simi Valley, Calif.

[73] Assignee: **The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

[21] Appl. No.: **852,771**

[22] Filed: **Nov. 18, 1977**

[51] Int. Cl.<sup>2</sup> ..... **H01S 3/08**

[52] U.S. Cl. .... **331/94.5 C; 331/94.5 D**

[58] Field of Search ..... **331/94.5 C, 94.5 D, 331/94.5 T**

[56] **References Cited**

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3,980,397	9/1976	Judd et al.	331/94.5 T

*Primary Examiner*—William L. Sikes  
*Attorney, Agent, or Firm*—Joseph E. Rusz; Jacob N. Erlich

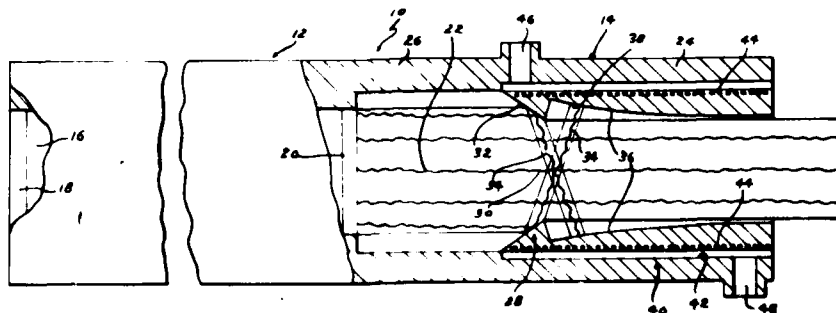
[57] **ABSTRACT**

An internal arresting beam clipper having a cylindrically shaped housing of predetermined length and a clipping mirror located at one end thereof. The clipping mirror is optically aligned with an out-of-round beam as well as being positioned at a preselected angle with respect to the longitudinal axis of the housing. The beam clipper removes the out-of-round portion of the beam by reflecting that portion of the beam against the wall of the housing. The housing acts as a heat sink and absorbs the rejected radiation that has been reflected thereto by the clipping mirror with the bulk of the beam being passed through the clipping mirror and onto a target.

**10 Claims, 3 Drawing Figures**

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# PATENT ABSTRACT

FROM THE AIR FORCE SYSTEMS COMMAND

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**United States Patent** [19]

[11] **4,168,500**

**Brassaw**

[45] **Sep. 18, 1979**

[54] **METHOD AND SYSTEM FOR MOVING  
TARGET ELIMINATION AND INDICATION  
USING SMOOTHING FILTERS**

3,706,989 12/1972 Taylor, Jr. .... 343/7 A

*Primary Examiner—Malcolm F. Hubler  
Attorney, Agent, or Firm—Joseph E. Rusz; Julian L.  
Siegel*

[75] **Inventor:** Lloyd L. Brassaw, Canoga Park,  
Calif.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 233,836

[22] **Filed:** Mar. 10, 1972

[51] **Int. Cl.:** G01S 9/22; G01S 9/42

[52] **U.S. Cl.:** 343/7.7; 343/5 CM;  
343/7 A; 343/16 M

[58] **Field of Search:** 343/7.7, 16 M, 5 CM,  
343/7 A

[56] **References Cited**

## U.S. PATENT DOCUMENTS

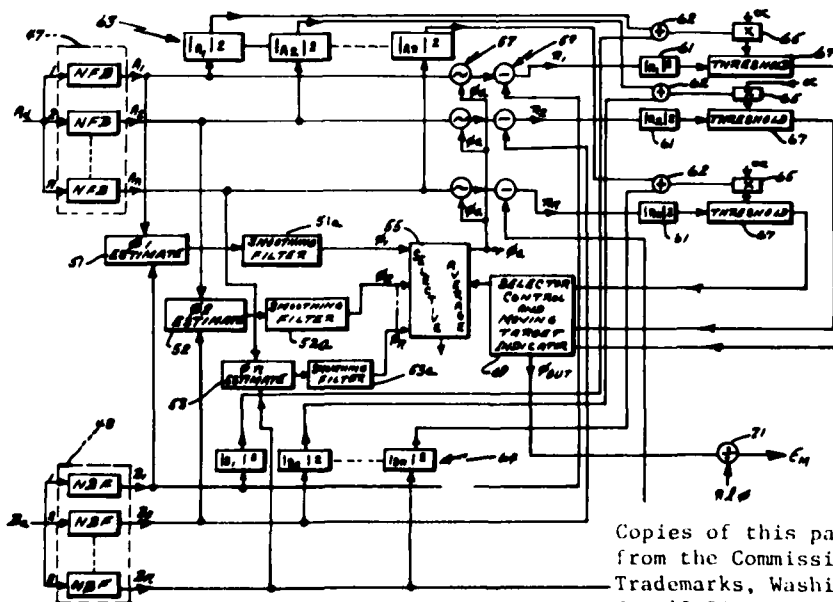
3,308,457 3/1967 Winn ..... 343/16 M X  
3,378,843 4/1968 Sherman ..... 343/16 M  
3,480,953 11/1969 Shreve ..... 343/7.7

## ABSTRACT

In-phase sum and difference signals and quadrature sum and difference signals from a monopulse radar system are processed to form the sum of the in-phase signals, the sum of the quadrature signals, the difference of the in-phase signals, and the difference of the quadrature signals. The processed sum signals and the processed difference signals are then combined to form complex signals one of which is advanced and the other retarded by predetermined time. The complex signals are then divided into sequences of frequencies of identical banks of narrow band filters. The differences between the outputs of corresponding filters from each bank are smoothed by low pass filters, averaged and then divided by a constant to form a beam pointing error value.

6 Claims. 3 Drawing Figures

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JAT 00130



# PATENT ABSTRACT

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United States Patent [19]

[11]

4,168,501

Brassaw

[45]

Sep. 18, 1979

[54] METHOD AND SYSTEM FOR MOVING  
TARGET ELIMINATION AND INDICATION

3,706,989 12/1972 Taylor, Jr.

343/7 A

[75] Inventor: Lloyd L. Brassaw, Canoga Park,  
Calif.

Primary Examiner—Malcolm F. Hubler

Attorney, Agent, or Firm—Joseph E. Rusz, Julian L.  
Siegel

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[57]

## ABSTRACT

In-phase sum and difference signals and quadrature sum and difference signals from a monopulse radar system are processed to form the sum of the in-phase signals, the sum of the quadrature signals, the difference of the in-phase signals, and the difference of the quadrature signals. The processed sum signals and the processed difference signals are then combined to form complex signals one of which is advanced and the other retarded by predetermined time. The complex signals are then divided into sequences of frequencies by identical banks of narrow band filters. The differences between the outputs of corresponding filters from each bank are averaged and then divided by a constant to form a beam pointing error value.

[21] Appl. No.: 233,835

[22] Filed: Mar. 10, 1972

[51] Int. Cl.<sup>2</sup> ..... G01S 9/22; G01S 9/42

[52] U.S. Cl. .... 343/7.7; 343/5 CM;  
343/7 A; 343/16 M

[58] Field of Search ..... 343/7.7, 16 M, 5 CM,  
343/7 A

## [56] References Cited

### U.S. PATENT DOCUMENTS

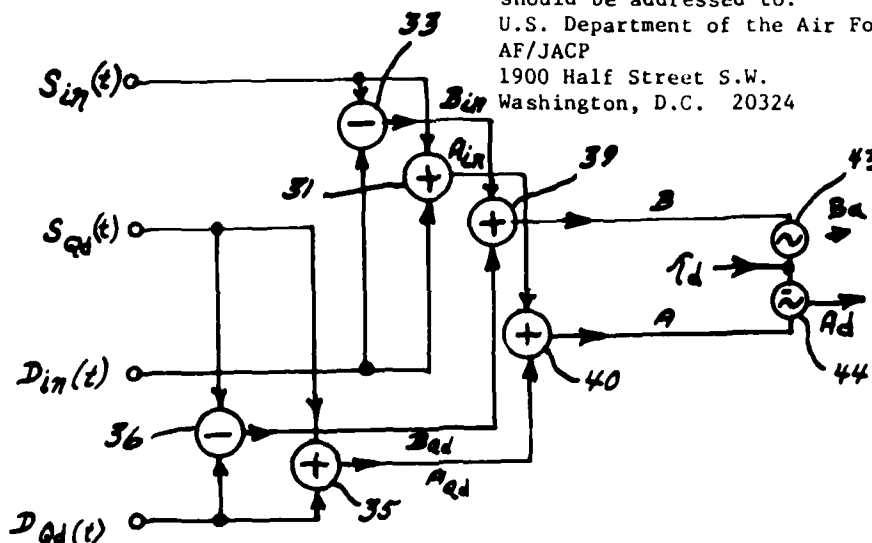
3,308,457	3/1967	Winn	343/16 M X
3,378,843	4/1968	Sherman	343/16 M
3,480,953	11/1969	Shreve	343/7.7

## 4 Claims, 3 Drawing Figures

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# PATENT ABSTRACT

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## United States Patent [19]

Dempsey et al.

[11] 4,168,532

[45] Sep. 18, 1979

### [54] MULTIMODE DATA DISTRIBUTION AND CONTROL APPARATUS

[75] Inventors: Gayle C. Dempsey, Needham;  
Richard P. Witt, Weston, both of  
Mass.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 771,598

[22] Filed: Feb. 24, 1977

[51] Int. Cl.<sup>2</sup> G06F 3/04

[52] U.S. Cl. 364/900

[58] Field of Search 179/15 R, 15 BA, 15 BV,  
179/15 AL; 364/200 MS File, 900 MS File

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### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,851,104	11/1974	Willard et al.	179/15 BV X
3,898,373	8/1975	Walsh	364/200 X
3,905,025	9/1975	Davis et al.	364/200
4,002,843	1/1977	Rackman	179/15 AL
4,053,950	10/1977	Bourke et al.	364/200

Primary Examiner—Gareth D. Shaw  
Assistant Examiner—Thomas M. Heckler  
Attorney, Agent, or Firm—Joseph E. Rusz; William  
Stepanishen

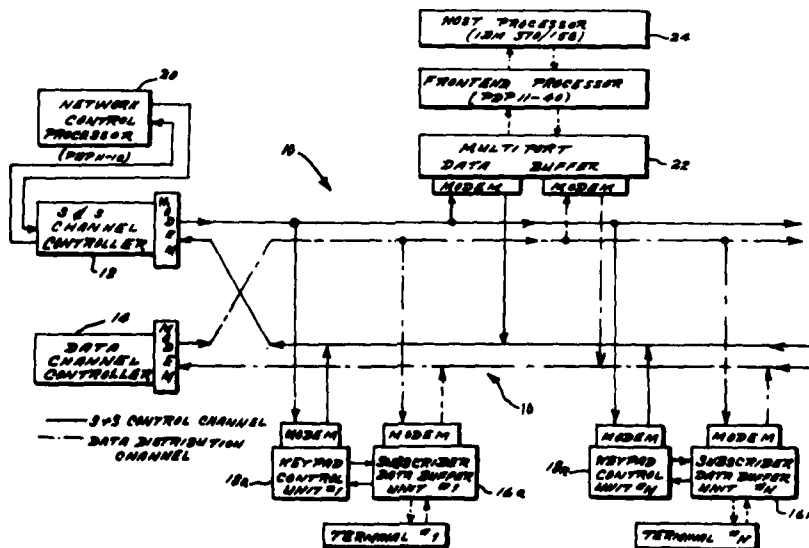
### [57]

#### ABSTRACT

A multiplex telecommunications system for simulta-  
neously handling digital data, video and voice traffic on  
a local level using either broadband coaxial cable or  
optic fibers as a transmission medium.

#### 5 Claims, 5 Drawing Figures

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should be addressed to:  
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# PATENT ABSTRACT

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United States Patent [19]  
Cubalchini

[11] 4,168,908  
[45] Sep. 25, 1979

- [54] **PRECISION POINTING AND TRACKING CONTROL SYSTEM**  
[75] Inventor: Ronald Cubalchini, Santa Monica, Calif.  
[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.  
[21] Appl. No.: 866,189  
[22] Filed: Dec. 30, 1977  
[51] Int. Cl.<sup>2</sup> ..... G01B 11/26  
[52] U.S. Cl. .... 356/152; 250/203 R; 356/363  
[58] Field of Search ..... 356/141, 152, 356, 358, 356/363; 250/203 R

Attorney, Agent, or Firm—Joseph E. Ruzs; Jacob N. Erlich

## [57] ABSTRACT

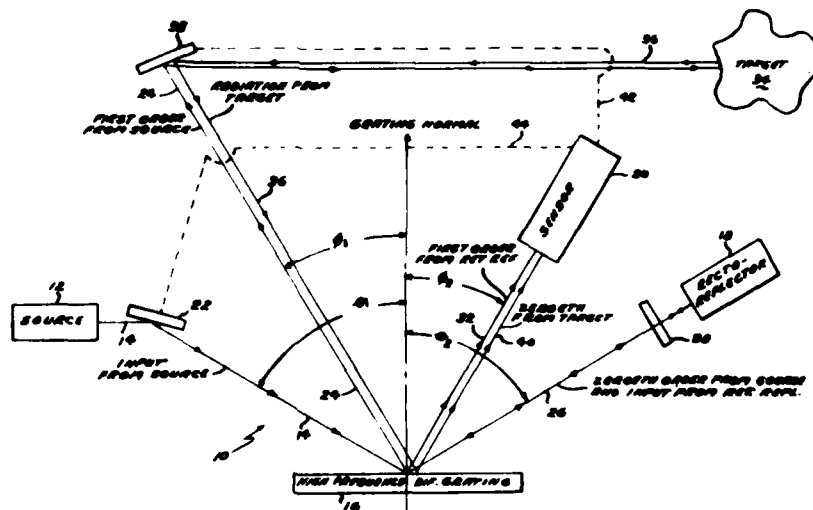
A precision pointing and tracking control system having a source for producing an electromagnetic beam, a high efficiency diffraction grating, a retroreflector, sensor and means for adjusting the optical relationship between the above elements and a target. The diffraction grating diffracts a large portion of an incident narrow spectral band or monochromatic beam into a single (non-zero) diffraction order in conjunction with the retroreflector as a means of (1) sampling the input narrow band or monochromatic beam, and (2) collecting any radiated electromagnetic energy coming from the direction of propagation (i.e., from the target or receiver). By maintaining a proper relationship between target and source radiation, precision pointing and tracking of the target by the beam produced from the source can be easily accomplished.

- [56] **References Cited**  
**U.S. PATENT DOCUMENTS**  
4,102,572 7/1978 O'Meara ..... 356/152  
4,140,398 2/1979 Hodder ..... 356/152

Primary Examiner—S. C. Buczinski

10 Claims, 1 Drawing Figure

Requests for licensing information should be addressed to:  
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JAT 00133



# PATENT ABSTRACT

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## United States Patent [19]

Wong et al.

[11] 4,169,267

[45] Sep. 25, 1979

### [54] BROADBAND HELICAL ANTENNAS

[75] Inventors: Jimmy L. Y. Wong, Redondo Beach;  
Howard E. King, Gardena, both of  
Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 916,685

[22] Filed: Jan. 19, 1978

[51] Int. Cl.<sup>2</sup> ..... H01Q 9/00; H01Q 1/36

[52] U.S. Cl. .... 343/895; 343/749

[58] Field of Search ..... 343/749, 750, 895

### [56] References Cited

#### U.S. PATENT DOCUMENTS

2,966,679	12/1960	Harris	343/895
3,569,979	3/1971	Mank et al.	343/895
3,683,393	8/1972	Self	343/895
3,940,772	2/1976	Ben-dov	343/895

### OTHER PUBLICATIONS

Angelakos, D. J. et al., "Modifications on the Axial-Mode Helical Antenna," in IEEE Proceedings, Apr. 1967, pp. 558-559.

Primary Examiner—Alfred E. Smith  
Assistant Examiner—Harry E. Barlow  
Attorney, Agent, or Firm—Joseph E. Ruaz; Willard R. Matthews

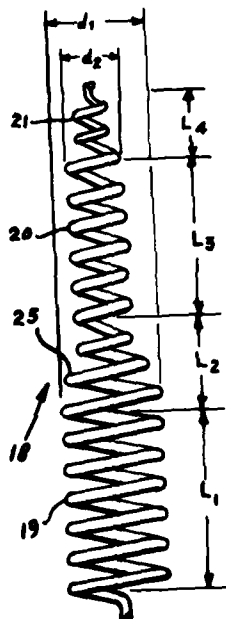
### [57] ABSTRACT

Increased bandwidth, reduced axial ratios and improved beam shape and sidelobe characteristics are achieved with non-uniform diameter helical antennas. The antenna structures are configured to various combinations of tapered diameter and uniform sections. By varying the number of turns, diameters of the helix sections and lengths of the various helix sections, antennas are synthesized to yield specific gain-frequency response characteristics.

### 2 Claims, 6 Drawing Figures

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should be addressed to:  
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# PATENT ABSTRACT

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## United States Patent [19]

Schell et al.

[11] 4,169,268

[45] Sep. 25, 1979

### [54] METALLIC GRATING SPATIAL FILTER FOR DIRECTIONAL BEAM FORMING ANTENNA

[75] Inventors: Allan C. Schell, Winchester; Robert J. Mailloz, Wayland, both of Mass.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 904,964

[22] Filed: May 11, 1978

#### Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 678,516, Apr. 19, 1976, abandoned.

[51] Int. Cl.<sup>2</sup> ..... H01Q 15/10

[52] U.S. Cl. .... 343/909

[58] Field of Search ..... 343/753, 754, 755, 872, 343/909, 911 R

#### [56] References Cited

##### U.S. PATENT DOCUMENTS

2,664,725	7/1956	Kock	343/909
2,756,424	7/1956	Lewis et al.	343/909
2,763,860	9/1956	Ortusi et al.	343/753

3,708,796 1/1973 Gilbert ..... 343/909

#### FOREIGN PATENT DOCUMENTS

1058285	3/1954	France	343/754
665747	1/1952	United Kingdom	343/753

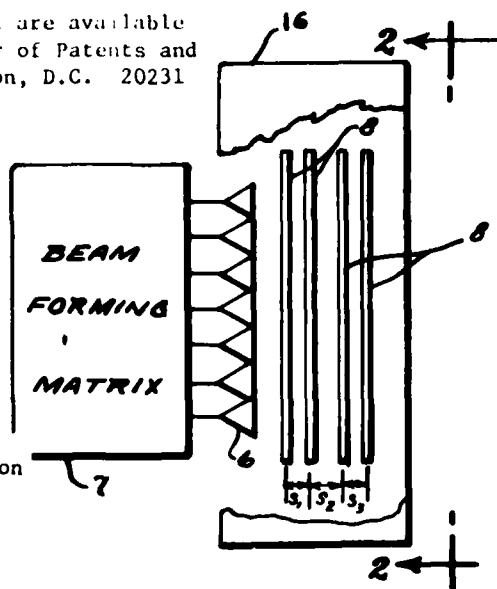
Primary Examiner—Eli Lieberman  
Attorney, Agent, or Firm—Joseph E. Ruz; Willard R. Matthews

#### [57] ABSTRACT

Sidelobe suppression and other beam transmission property manipulations in directional beam forming antennas is accomplished by means of a spatial filter. The filter geometry consists of a plurality of metallic gratings separated by air or other low dielectric constant dielectric substance. The filter is placed directly over the antenna radiating aperture and is encompassed by a tunnel structure of electromagnetic wave energy absorbing material. The shunt susceptance characteristics of the metallic gratings together with the integrating spacing distances are synthesized in a manner that effects full transmission of beam power in a selected beam direction while offering substantial rejection of it in other directions.

7 Claims, 11 Drawing Figures

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# PATENT ABSTRACT

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## United States Patent [19]

Goebel et al.

[11]

4,170,008

[45]

Oct. 2, 1979

### [54] CLUTTER DISCRIMINATING FUZE APPARATUS

[75] Inventors: Robert H. Goebel, Bridgeton; Dale A. Fogle, St. Louis Township, St. Louis County, both of Mo.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 553,360

[22] Filed: Feb. 28, 1975

[51] Int. Cl.<sup>2</sup> F42C 13/04; G01S 9/37

[52] U.S. Cl. 343/7 PF; 102/214

[58] Field of Search 343/7 PF; 102/214

[56]

### References Cited

#### U.S. PATENT DOCUMENTS

3,332,077	7/1967	Nard et al.	343/7 PF
3,821,737	6/1974	Kalmus	343/7 PF
3,858,207	12/1974	Macomber et al.	343/7 PF
3,906,493	9/1975	Adrian et al.	343/7 PF

Primary Examiner—Malcolm F. Hubler  
Attorney, Agent, or Firm—Joseph E. Rusz; William Stepanishen

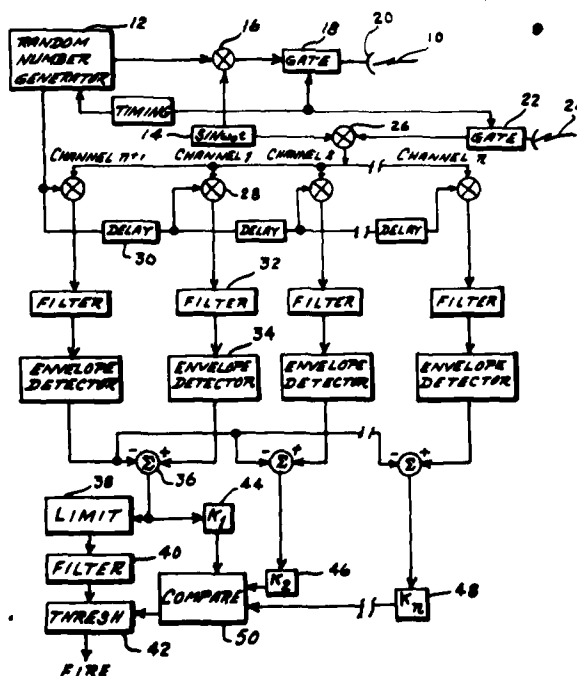
[57]

### ABSTRACT

A clutter discriminating fuze apparatus for preventing prefires and duds which may result through the use of electronic countermeasure techniques by the enemy.

5 Claims, 1 Drawing Figure

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# PATENT ABSTRACT

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## United States Patent [19]

[11] 4,173,122

Wilkinson

[45] Nov. 6, 1979

- [54] INTERMITTENT BURNING JET ENGINE
- [75] Inventor: David B. Wilkinson, Xenia, Ohio
- [73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
- [21] Appl. No.: 876,442
- [22] Filed: Feb. 9, 1978
- [51] Int. Cl.<sup>2</sup> ..... F02K 7/02
- [52] U.S. Cl. .... 60/247; 60/270 R
- [58] Field of Search ..... 60/39.76, 39.77, 247, 60/248, 249, 270 R

2,745,248 5/1956 Winter et al. .... 60/247  
2,834,183 5/1958 Bertin et al. .... 60/249  
3,533,239 10/1970 Ghougasian ..... 60/247

Primary Examiner—Louis J. Casaregola  
Attorney, Agent, or Firm—Joseph E. Ruzs; Richard J. Killoren

### ABSTRACT

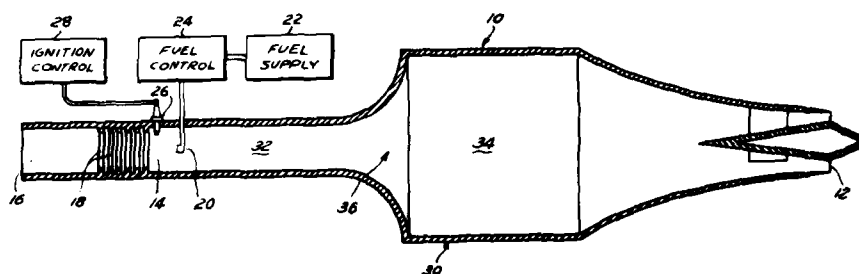
[57] An intermittent burning ramjet engine having a rough wall combustor with fuel supplied to a fuel injector upstream of the combustor. The fuel is cyclically ignited at a predetermined frequency. A resonator tuned to a frequency less than one-tenth of the combustor frequency is positioned between the combustor and the ramjet inlet.

### References Cited

### U.S. PATENT DOCUMENTS

2,647,365 8/1953 Myers ..... 60/270 R

3 Claims, 1 Drawing Figure



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# PATENT ABSTRACT

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**United States Patent** [19]  
**Macdonald**

[11] **4,173,322**  
[45] **Nov. 6, 1979**

[54] **FLUTTER PREVENTION MEANS FOR  
AIRCRAFT PRIMARY FLIGHT CONTROL  
SURFACES**

[75] **Inventor:** Kenneth A. B. Macdonald, Maple  
Valley, Wash.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 900,621

[22] **Filed:** Apr. 27, 1978

[51] **Int. Cl.:** B64C 13/00

[52] **U.S. Cl.:** 244/75 A; 244/83 A

[58] **Field of Search:** 244/83 A, 75 R, 75 A,  
244/78, 90 R, 213, 215

[56] **References Cited**

## U.S. PATENT DOCUMENTS

1,747,344	2/1930	Bell	244/83 A
2,246,203	6/1941	Florez	244/83 A
2,835,459	5/1958	Stewart	244/83 A

## FOREIGN PATENT DOCUMENTS

403223	4/1943	Italy	244/83 A
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*Primary Examiner*—Galen L. Barefoot  
*Attorney, Agent, or Firm*—Joseph E. Rusz; James S.  
Shannon; Casimer K. Salys

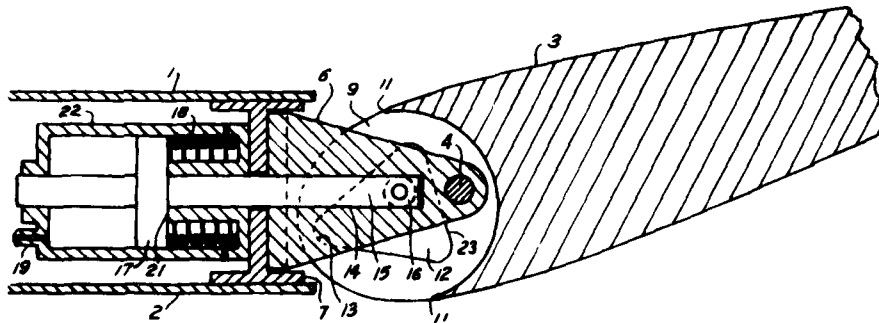
## [57] ABSTRACT

An apparatus attached to the flight control surface designed to lock the surface in a fixed and generally neutral position when a hydraulic pressure failure occurs. A spring loaded hydraulic actuator is mounted in the fixed wing structure but has an arm with a locking roller extending into a wedge shaped recess in the adjacent movable control surface. When hydraulic pressure is present the actuator spring is compressed and the locking roller on the actuator arm is moved to the wide end of the wedge, effectively avoiding any contact between the roller and the flight control surface surrounding it irrespective of the control surface orientation. Upon the occurrence of a hydraulic pressure drop, the compressed spring translates the actuator arm drawing the locking roller into a detent in the narrow end of the wedge, thereby inhibiting control surface rotation and flutter.

**2 Claims, 3 Drawing Figures**

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# PATENT ABSTRACT

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**United States Patent** [19]  
**Palmer**

[11] **4,175,812**  
[45] **Nov. 27, 1979**

[54] **ELECTRICALLY CONDUCTIVE BONDING  
STRAP FOR CONNECTING MOVABLE  
PARTS**

[75] **Inventor:** Arlo K. Palmer, Renton, Wash.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 891,873

[22] **Filed:** Mar. 30, 1978

[51] **Int. Cl.:** H02G 13/00

[52] **U.S. Cl.:** 339/29 R; 174/2

[58] **Field of Search:** 339/19, 28, 29, 222,  
339/277; 174/2, 4, 5; 361/218; 244/1 A

[56] **References Cited**

## U.S. PATENT DOCUMENTS

2,129,493	9/1938	Deems	238/14.13
2,286,415	6/1942	Hewel	339/29 B
2,623,918	12/1952	Hartwell	174/2

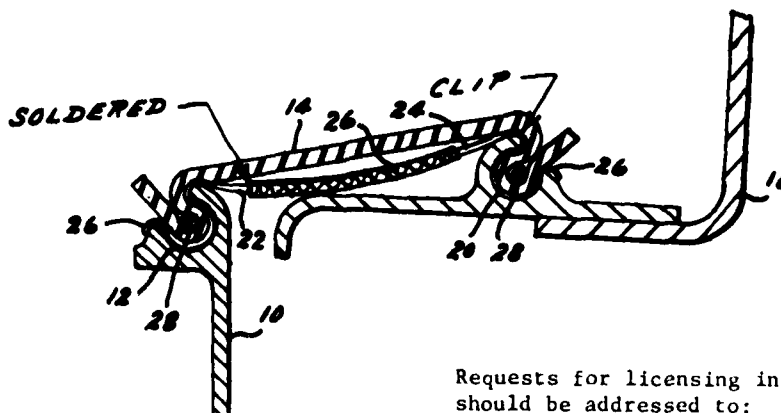
**Primary Examiner**—Neil Abrams  
**Attorney, Agent, or Firm**—Joseph E. Ruzs; Henry S.  
Miller

[57] **ABSTRACT**

The invention comprises a braided wire having a shaped clip soldered or otherwise connected to each end. The clip is so formed as to follow the shape of a retainer which is designed to secure a rubber weather seal by means of a cable and groove arrangement.

**5 Claims, 2 Drawing Figures**

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## United States Patent [19]

Kuhn, Jr.

[11] 4,175,835

[45] Nov. 27, 1979

### [54] FLOATING HEAD LASER MIRROR ASSEMBLY

[75] Inventor: Ralph F. Kuhn, Jr., Calabasas, Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 926,358

[22] Filed: Jul. 20, 1978

[51] Int. Cl.<sup>2</sup> ..... G02B 7/18

[52] U.S. Cl. .... 350/310

[58] Field of Search ..... 350/310, 288

### [56] References Cited

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1,801,285	4/1931	Mills	350/310
3,637,296	1/1972	McLafferty et al.	350/310
3,676,274	7/1972	Matulis	350/310
3,708,223	1/1973	Sorensen et al.	350/310
3,731,992	5/1973	Mansell	350/310
3,781,094	12/1973	Griest	350/310

3,926,510	12/1975	Locke et al.	350/310
3,942,880	3/1976	Zeiders, Jr.	350/310
4,060,315	11/1977	Heinz	350/310

Primary Examiner—Jon W. Henry  
Attorney, Agent, or Firm—Joseph E. Ruz; Jacob N.  
Erlach

### [57]

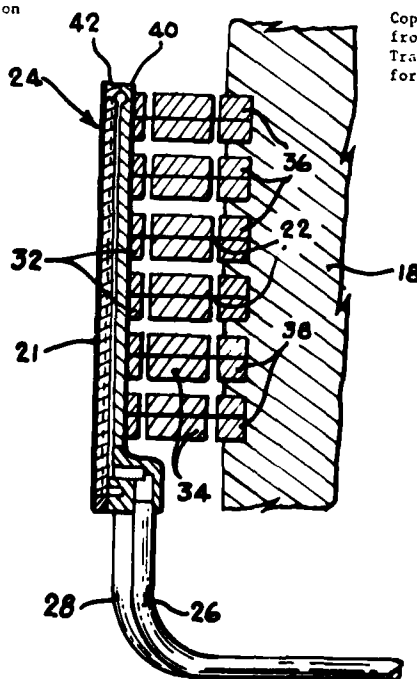
### ABSTRACT

A high power floating head laser mirror assembly having a mirror head, a base structure and a plurality of flexure elements interposed between the mirror head and the base structure for "floatingly" supporting the mirror head with respect to the base structure. In order to preserve proper mirror head alignment and yet allow radial expansion of the mirror head a plurality of posts are located adjacent the flexure elements thereby exposing only a predetermined portion of the flexure element. As a result of the above assembly, the mirror surface is capable of reliable operation within a laser having a light intensity in excess of 5 Kw/cm<sup>2</sup>.

### 9 Claims, 4 Drawing Figures

Requests for licensing information  
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1900 Half Street S.W.  
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JAT 00140



# PATENT ABSTRACT

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## United States Patent [19]

Harvey et al.

[11] 4,177,227

[45] Dec. 4, 1979

### [54] LOW SHEAR MIXING PROCESS FOR THE MANUFACTURE OF SOLID PROPELLANTS

[75] Inventors: Kenneth L. Harvey, Pleasant Grove;  
Howard D. Dixon, Salt Lake City,  
both of Utah

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 612,435

[22] Filed: Sep. 10, 1975

[51] Int. Cl.<sup>2</sup> ..... C06B 45/10

[52] U.S. Cl. .... 264/3 R; 149/19.1;  
149/19.9; 149/19.92

[58] Field of Search ..... 149/7, 19.9, 19.92,  
149/19.1; 264/3 R

### [56] References Cited U.S. PATENT DOCUMENTS

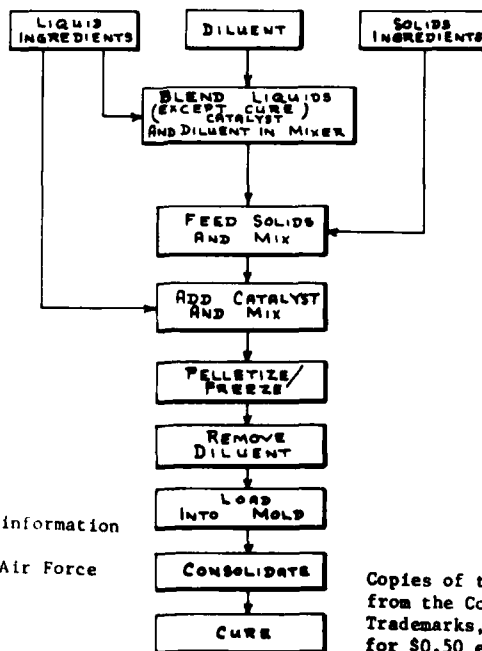
3,685,163	8/1972	Olt	149/19.92 X
3,730,792	5/1973	Frost et al.	149/19.9
3,801,385	4/1974	Mastrolia et al.	149/19.9
3,834,957	9/1974	McDevitt et al.	264/3 R X
3,870,578	3/1975	Nichols	264/3 R X
3,892,610	7/1975	Huzinec	149/19.92 X

Primary Examiner—Edward A. Miller  
Attorney, Agent, or Firm—Joseph E. Rusz; William J.  
O'Brien

### [57] ABSTRACT

A low shear mixing process for preparing high solids, high viscosity rocket propellants in which the propellant ingredients are blended with an inert diluent to reduce the high shear mixing environment generated by conventional mixing techniques. The diluent is then removed by sublimation from the mixture through a freeze drying process prior to curing and casting the mix according to conventional techniques.

2 Claims, 1 Drawing Figure



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## United States Patent [19]

Mazdiyani

[11] 4,177,230

[45] Dec. 4, 1979

[54] PROCESS FOR PRODUCING REACTION  
SINTERED SILICON NITRIDE OF  
INCREASED DENSITY

[75] Inventor: Khodabakhsh S. Mazdiyani, Xenia,  
Ohio

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 911,746

[22] Filed: Jan. 2, 1978

[51] Int. Cl.<sup>2</sup> ..... C04B 35/56; C04B 35/58;  
C01B 21/06

[52] U.S. Cl. .... 264/68; 106/44;  
106/73.5; 264/65; 264/66; 423/344; 423/406

[56] Field of Search ..... 423/344, 406; 106/44,  
106/73.5; 264/60, 65, 66

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,892,583 7/1975 Winter et al. .... 106/44

#### FOREIGN PATENT DOCUMENTS

2236078 3/1974 Fed. Rep. of Germany ..... 106/44  
1432559 4/1976 United Kingdom ..... 423/344

Primary Examiner—Jack Cooper  
Attorney, Agent, or Firm—Joseph E. Ruz; Cedric H.  
Kuhn

### [57] ABSTRACT

Porous reaction sintered silicon nitride body is infiltrated with an organosilicon compound after which the body is heated at a temperature sufficient to decompose the infiltrated material, resulting in a silicon nitride body having an increased density and significantly improved room temperature strength.

3 Claims, No Drawings

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# PATENT ABSTRACT

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## United States Patent [19]

Beeler

[11] 4,177,308

[45] Dec. 4, 1979

[54] NON-COMBUSTIBLE HIGH  
TEMPERATURE ABRADABLE SEAL  
MATERIAL

[75] Inventor: David R. Beeler, Fairfield, Ohio

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 932,814

[22] Filed: Aug. 10, 1978

[51] Int. Cl.<sup>2</sup> ..... C04B 21/00

[52] U.S. Cl. .... 428/117; 106/40 R

[58] Field of Search ..... 106/40 R, 40 V;  
428/117

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,041,205	6/1962	Iler .....	106/40 R
3,068,016	12/1962	Dega .....	428/117
3,126,149	3/1964	Bowers, Jr. et al. ....	428/117
3,991,254	11/1976	Takeuchi ..	106/40 R

Primary Examiner—O. R. Vertiz

Assistant Examiner—Mark well

Attorney, Agent, or Firm—Joseph E. Ruzs; Cedric H.  
Kuhn

### [57] ABSTRACT

A non-combustible, abrasible sealant composition for  
jet engines comprising a major amount of aluminum  
phosphate and a minor amount of silica or glass micro-  
spheres.

11 Claims, No Drawings

Requests for licensing information should be addressed to:  
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**United States Patent** [19]

[11] **4,177,328**

**Rogers**

[45] **Dec. 4, 1979**

[54] **WALL WICK FOR NICKEL-HYDROGEN CELL**

[75] **Inventor:** Howard H. Rogers, Culver City, Calif.

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] **Appl. No.:** 970,910

[22] **Filed:** Dec. 19, 1978

[51] **Int. Cl.:** H01M 12/06

[52] **U.S. Cl.:** 429/81; 429/101

[58] **Field of Search:** 429/38, 39, 81, 34, 429/101, 144, 145, 59, 33, 247, 72

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

2,988,584 6/1961 Peters ..... 429/247  
3,333,986 8/1967 Chreitzberg et al. .... 429/81

3,532,549 10/1970 Bradley et al. .... 429/101  
3,615,845 10/1971 Gray ..... 429/34  
4,004,067 1/1977 Briggs et al. .... 429/101

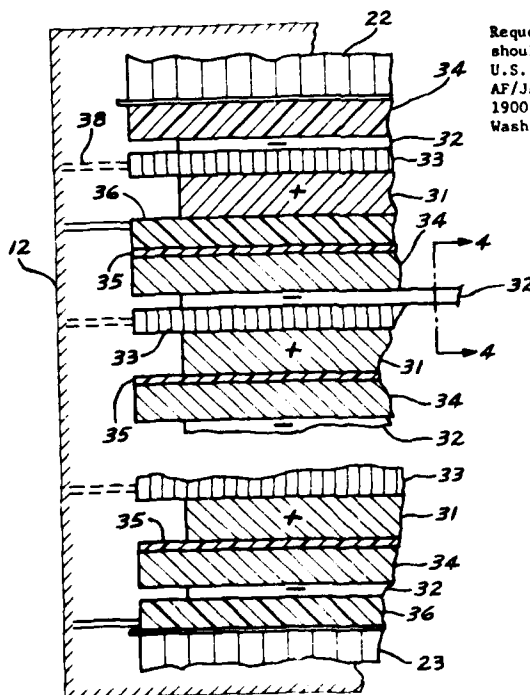
**Primary Examiner**—Donald L. Walton

**Attorney, Agent, or Firm**—Joseph E. Ruzs; Robert Kern Duncan

[57] **ABSTRACT**

Electrolyte, lost from the stack to the case in a sealed electrochemical cell, is returned to the stack by a zirconium oxide based ceramic deposited on the inside wall of the pressure vessel, wicking by capillary action, the electrolyte from regions external to the stack to the stack components. The ceramic wick is also used to transfer electrolyte from one separator and/or reservoir to another within the stack, replacing an interior stack wick in a recirculating design. The wall wick is also effective in a back-to-back type cell design.

**3 Claims, 4 Drawing Figures**



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# PATENT ABSTRACT

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## United States Patent [19]

McLaughlin et al.

[11] 4,177,437

[45] Dec. 4, 1979

### [54] HIGH POWER PRE-TR SWITCH

[75] Inventors: James F. McLaughlin, Severna Park;  
Harry Goldie, Randallstown, both of  
Md.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 871,066

[22] Filed: Jan. 20, 1978

[51] Int. Cl.<sup>2</sup> ..... H01P 1/14

[52] U.S. Cl. .... 333/13; 313/221;  
315/111.2

[58] Field of Search ..... 333/13; 313/180, 221,  
313/222, 229, 231.3, 480; 315/39, 111.2

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,219,868	11/1965	Mason et al.	313/221 X
3,497,833	2/1970	Goldie et al.	333/13
3,648,100	3/1972	Goldie et al.	315/39
3,705,319	12/1972	Goldie et al.	333/13 X
3,753,158	8/1973	Prescott	333/13
4,120,808	10/1978	Byrum, Jr. et al.	313/221 X

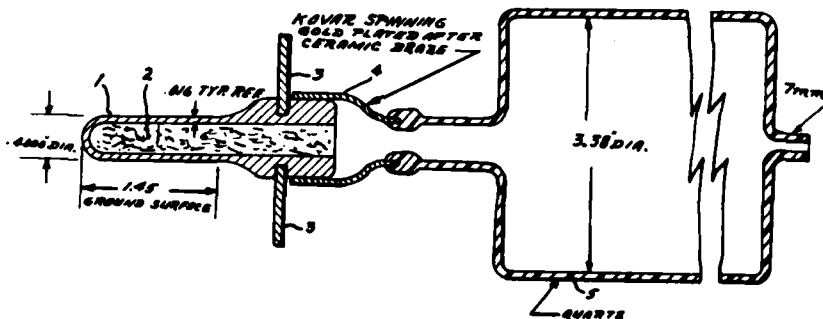
Primary Examiner—Paul L. Gensler

Attorney, Agent, or Firm—Joseph E. Rusz; George Fine

### [57] ABSTRACT

A high power pre-TR switch utilizes hot pressed boron nitride to form a vial. The vial contains a halogen gas such as chlorine.

1 Claim, 1 Drawing Figure



Requests for licensing information should be addressed to:  
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## United States Patent [19]

Lundvall, I et al.

[11] 4,177,465

[45] Dec. 4, 1979

### [54] NEAR-RANGE PERSONNEL BEACON LOCATOR APPARATUS

[75] Inventors: Donald O. Lundvall, I, Papillion;  
John P. Engels; Robert R. Yeacoms,  
both of Omaha, all of Nebr.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 949,189

[22] Filed: Oct. 6, 1978

[51] Int. Cl.<sup>2</sup> ..... G01S 11/00

[52] U.S. Cl. .... 343/112 D

[58] Field of Search ..... 343/112 D

### [56] References Cited

#### U.S. PATENT DOCUMENTS

2,571,368 10/1951 Kahn et al. .... 343/112 D  
4,023,176 5/1977 Currie ..... 343/112 D

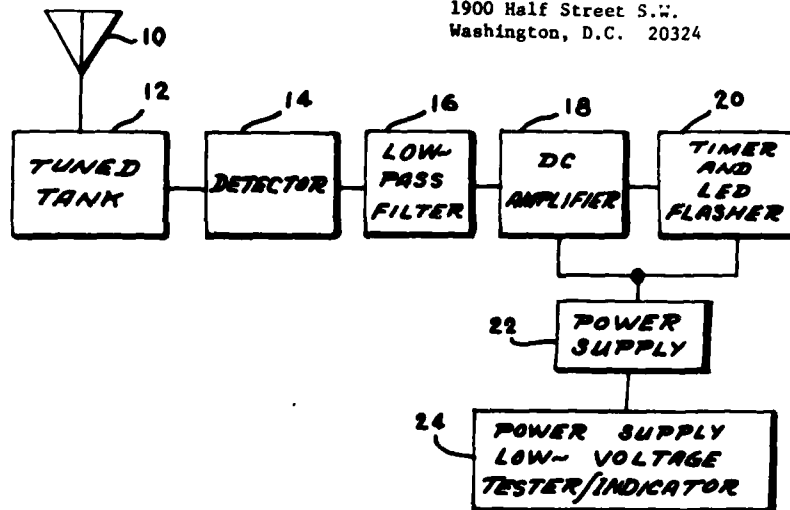
Primary Examiner—Maynard R. Wilbur  
Assistant Examiner—Richard E. Berger  
Attorney, Agent, or Firm—Joseph E. Rusz; William  
Stepanishen

### [57] ABSTRACT

A near-range personnel beacon locator apparatus utilizing a tuned tank circuit to receive the emitted signal from an activated personnel beacon. The detected signal is applied to a D.C. amplifier to provide a D.C. level which drives a controlled variable duty cycle timer for driving a light emitting diode indicator.

### 7 Claims, 4 Drawing Figures

Requests for licensing information  
should be addressed to:  
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TAT 00147



# PATENT ABSTRACT

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## United States Patent [19]

Blampitts

[11] 4,177,493

[45] Dec. 4, 1979

### [54] HIGH VOLTAGE ANTENNA PROTECTION SYSTEM

[75] Inventor: Emmanuel E. Blampitts, Lexington, Mass.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 865,733

[22] Filed: Dec. 29, 1977

[51] Int. Cl.<sup>2</sup> ..... H02H 7/20

[52] U.S. Cl. .... 361/36; 333/12; 343/904; 361/117; 361/118; 361/133

[58] Field of Search ..... 361/56, 54, 43, 118, 361/119, 117, 133, 134, 129, 212, 220, 221; 333/12, 17 L; 324/109; 343/720, 851, 904, 905, 906

### [56] References Cited

#### U.S. PATENT DOCUMENTS

500,455	6/1893	Watts	361/133
3,112,429	11/1963	Person	361/134
3,280,376	10/1966	Person	361/133

### FOREIGN PATENT DOCUMENTS

171666 6/1952 Fed. Rep. of Germany ..... 361/133

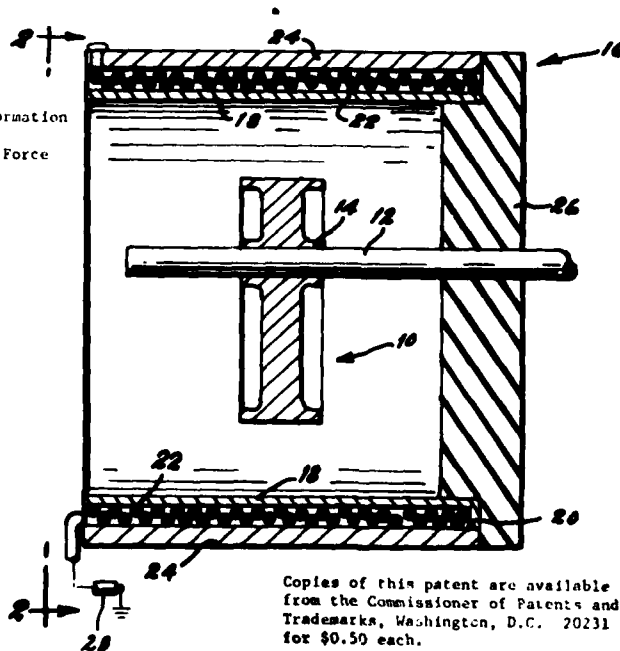
Primary Examiner—Patrick R. Salce  
Attorney, Agent, or Firm—Joseph E. Ruzs; Henry S. Miller

### [57] ABSTRACT

A device for the protection of antennas against lightning and electromagnetic pulse consisting of an electrically conducting rotor that is free to turn on a conducting shaft which is connected to the antenna. This combination is placed within an electric coil with one end connected to ground. The rotor is mounted eccentrically within the coil so that when a predetermined critical voltage on the antenna is exceeded electrical current flows through the rotor, and coil to ground via the air gap separating the rotor and coil, a magnetic field is set up in the coil which turns the rotor and reduces the air gap as the voltage is dissipated, after discharge of the surge, the rotor returns to its quiescent position.

5 Claims, 2 Drawing Figures

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# PATENT ABSTRACT

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## United States Patent [19]

Wess

[11] 4,177,681

[45] Dec. 11, 1979

### [54] APPARATUS FOR ADJUSTING AND LOCKING A LINEAR ACTUATOR

[75] Inventor: Thomas B. Wess, Cincinnati, Ohio

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 893,868

[22] Filed: Apr. 6, 1978

[51] Int. Cl.<sup>2</sup> ..... F16H 21/44; F1 21/54; F16H 25/18

[52] U.S. Cl. .... 74/110; 74/522; 74/586; 92/13.41; 92/13.8; 244/85; 403/118; 403/320

[58] Field of Search ..... 244/85; 97/13.41, 13.8, 92/13.4; 188/196 A, 196 C; 100/257; 74/522, 110, 586; 403/118, 320, 343

### [56] References Cited

#### U.S. PATENT DOCUMENTS

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1,811,913	6/1931	Browall	188/196 C
1,837,473	12/1931	Neveu	188/196 C
2,300,831	11/1942	James	92/13.41
2,431,070	11/1947	Nelson	74/110
2,442,306	5/1948	McCormick	92/13.41
2,619,304	11/1952	Feeney et al.	244/85
2,716,965	9/1955	Klamp	92/13.8
2,753,134	7/1956	Gordon et al.	244/85
2,861,758	11/1958	Howard	244/9

2,972,898	2/1961	Hartel	74/105
2,976,844	3/1961	Goldring	92/13.41
3,232,182	2/1966	Gilbert	92/13.41
3,392,909	7/1968	Turner	91/189
3,763,747	10/1973	Beichel et al.	74/110 X
3,815,471	6/1974	Kobelt	91/189
3,893,544	7/1975	Means	188/196 A
3,904,301	9/1975	Schroeder	403/320 X
4,114,250	9/1978	Dent	403/343 X

### FOREIGN PATENT DOCUMENTS

19963	3/1972	Australia	92/13.8
421989	3/1911	France	74/586
32395	11/1927	France	403/343
724755	2/1955	United Kingdom	244/226

Primary Examiner—Leslie Braun

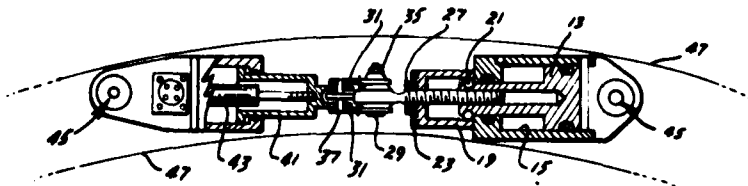
Attorney, Agent, or Firm—Joseph E. Rusz; Arsen Tashjian

[57]

### ABSTRACT

A cylindrical linear actuator suitable for installation in a confined area and capable of infinite stroke adjustment over its scheduled travel and lockable at any position of its designated stroke includes overlapping and combining rod end stroke adjustments to minimize actuator length. Electrical feedback is precalibrated to give a known signal proportional to the actuator stroke and to the position of the load clevis thereby always giving the correct position of the load.

3 Claims, 2 Drawing Figures



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## United States Patent [19]

Arnold et al.

[11] 4,178,428

[45] Dec. 11, 1979

### [54] THERMALLY STABLE ENYNE POLYSULFONE POLYMERS

[75] Inventors: Fred E. Arnold, Centerville; Bruce A. Reinhardt, New Carlisle, both of Ohio

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 946,291

[22] Filed: Sep. 27, 1978

[51] Int. Cl.<sup>2</sup> ..... C08G 75/23

[52] U.S. Cl. .... 528/174; 260/30.8 R;  
260/607 AR; 428/411; 528/125; 528/126;  
528/128

[58] Field of Search ..... 528/174, 125, 126, 128;  
260/30.8 R, 607 AR

### [56] References Cited

#### U.S. PATENT DOCUMENTS

4,108,926 12/1978 Arnold et al. .... 528/174

Primary Examiner—Lester L. Lee

Attorney, Agent, or Firm—Joseph E. Ruzs; Cedric H. Kuhn

### [57] ABSTRACT

High molecular weight enyne polysulfone thermoplastics are prepared by the reaction of alkali metal salts of 1,4-bis(3-hydroxyphenyl)-buta-1-ene-3-yne and various aromatic diols with aromatic dihalosulfones. Because of the presence of the enyne moiety in the polymer backbone, the polymer can be lightly crosslinked to provide solvent resistant thermoplastics. The polymers are useful in fabricating graphite thermoplastic composites for structural applications.

9 Claims, No Drawings

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**United States Patent** [19]

[11] **4,179,190**

**Friedman et al.**

[45] **Dec. 18, 1979**

**[54] WIDE BAND ADJUSTABLE BREWSTER  
ANGLE POLARIZER**

[75] Inventors: **Jerome D. Friedman; Carl A. Pitha,**  
both of Lexington, Mass.

[73] Assignee: **The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.**

[21] Appl. No.: **866,742**

[22] Filed: **Jan. 3, 1978**

[51] Int. Cl.<sup>2</sup> ..... **G02B 5/30**

[52] U.S. Cl. .... **350/152**

[58] Field of Search ..... **350/152**

**[56] References Cited**

**U.S. PATENT DOCUMENTS**

2,651,971	9/1953	Roach	350/152
3,428,388	2/1969	Kuebler et al.	350/152
3,439,968	4/1969	Hansen et al.	350/152

**FOREIGN PATENT DOCUMENTS**

1155625	5/1958	France	350/152
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Copies of this patent are available  
from the Commissioner of Patents and  
Trademarks, Washington, D.C. 20231  
for \$0.50 each.

**OTHER PUBLICATIONS**

Klauser, H. E., "Infrared Polarizer", *IBM Technical  
Disclosure Bulletin*, vol. 6, No. 10, Mar. 1964, p. 51.

*Primary Examiner*—John K. Corbin

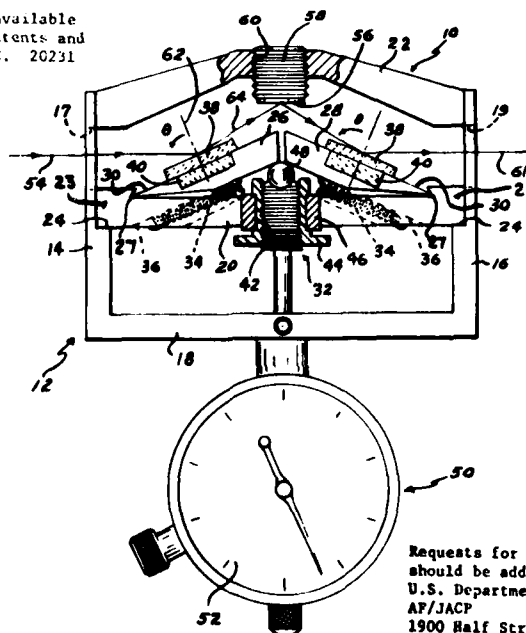
*Assistant Examiner*—R. A. Rosenberger

*Attorney, Agent, or Firm*—Joseph E. Ruz; Jacob N.  
Erlich

**[57] ABSTRACT**

A wide band adjustable Brewster angle polarizer having a pair of dielectric elements adjustably mounted within a housing. A dial micrometer is operably attached to the means for adjusting the angular relationship between the normal to the dielectric material and an incoming beam of unpolarized light. The micrometer is calibrated in direct relationship between the wavelength of the incoming beam of light and the establishment of a Brewster angle between the normal to the dielectric material and the incoming beam. Thereby, by proper selection of the dielectric material, light ranging from the ultraviolet to the infrared range of the optical spectrum can be quickly and reliably polarized.

**8 Claims, 1 Drawing Figure**



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**JAT 00151**





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United States Patent [19]

**(11) 4,179,657**

## Hobbs

[45] **Dec. 18, 1979**

**[54] ANTI-JAMMING COMMUNICATION SYSTEM**

[75] Inventor: **Charles F. Hobbs, Medford, Mass.**

[73] Assignee: **The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

[21] Appl. No.: 757,885

[22] Filed: Aug. 28, 1958

[51] **Int. Cl.<sup>2</sup>** ..... **H04K 1/00; H04L 9/00**

[52] **U.S. Cl.** ..... **325/33; 178/22**

[58] **Field of Search** ..... 179/15 AS; 325/33;

178/22, 5.1

[56] **References Cited**

## U.S. PATENT DOCUMENTS

2,510,338	6/1950	Guanella	250/6.6 X
2,517,587	8/1950	Mohr	250/6.6 X
2,709,218	5/1955	Gabilovitch	250/6.6 X
2,720,557	10/1955	Goodall	178/43.5
2,923,764	2/1960	Druz et al.	178/5.1
2,952,735	9/1960	Weiss	250/6.6

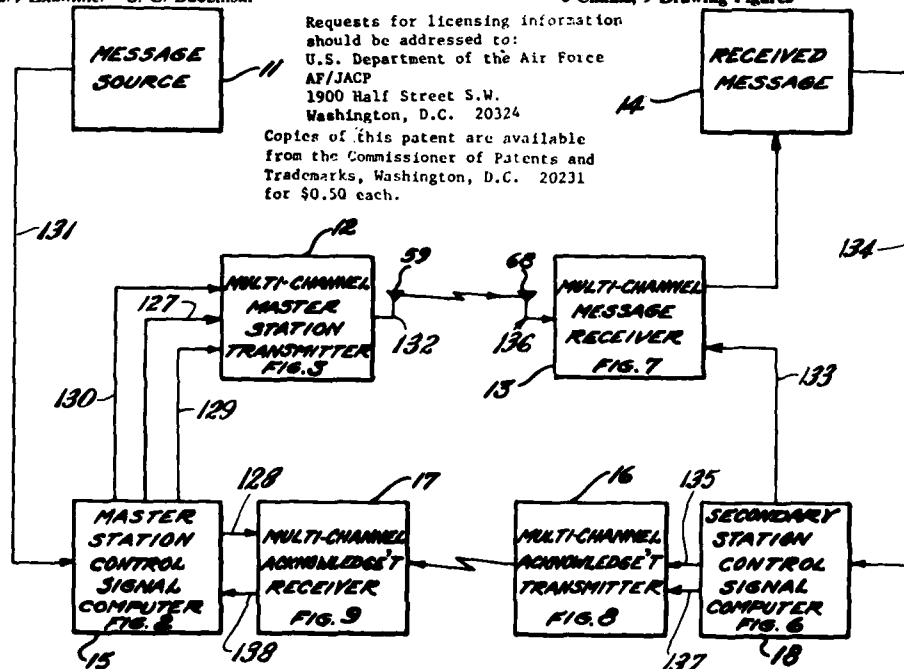
**Primary Examiner—S. C. Buczinski**

**Attorney, Agent, or Firm—**Joseph E. Rusz; George Fine

### EXEMPLARY CLAIM

1. A system of communications to an intended destination in a manner to elude detection by unauthorized sources, and to prevent jamming, which comprises multi-channel transmitting means, each of said channel transmitting means having a different frequency and delay, said frequency and delay being variable, means to generate time and address digits, means to encipher said time and address digits, means to initially set the frequencies and delays in each of said transmitting channels, said setting means receiving said enciphered time and address digits, means to convert a message to be transmitted into digital bits, means to encipher said message digital bits, means for multiple transmission of the initial message digital bit after said setting of channels, and means to successively reset the frequency and delay in each of said transmitting channels after said multiple transmission of said first message digital bit, said resetting means receiving successive enciphered message digital bits until said message is completely transmitted.

**6 Claims, 9 Drawing Figures**



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JAT 00152



# PATENT ABSTRACT

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United States Patent [19]

[11] 4,179,799

Fritts

[45] Dec. 25, 1979

[54] METHOD OF MOLDING A DOUBLE  
CATHODE HAVING A SENSING GRID FOR  
A POROUS ELECTRODE PRIMARY  
BATTERY

[75] Inventor: David H. Fritts, Dayton, Ohio

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 896,863

[22] Filed: Apr. 17, 1978

## Related U.S. Application Data

[62] Division of Ser. No. 844,162, Oct. 21, 1977, Pat. No.  
4,126,735.

[51] Int. Cl.<sup>1</sup> ..... H01M 4/08

[52] U.S. Cl. .... 29/623.5; 264/105;  
429/91

[58] Field of Search ..... 29/623.1, 623.5;  
264/104, 105; 429/93, 91, 92, 233, 178, 218

Copies of this patent are available  
from the Commissioner of Patents and  
Trademarks, Washington, D.C. 20231  
for \$0.50 each.

[56]

## References Cited

### U.S. PATENT DOCUMENTS

2,988,590	6/1961	Andre	429/93
3,206,335	9/1965	Sundberg	429/93
3,720,869	3/1973	Rowlette	429/93
3,901,960	8/1975	Holloway et al.	264/104
3,944,434	3/1976	Grüppel et al.	29/623.5
4,020,243	4/1977	Oldford	429/93

Primary Examiner—Daniel C. Crane  
Attorney, Agent, or Firm—Joseph E. Rusz; Robert Kern  
Duncan

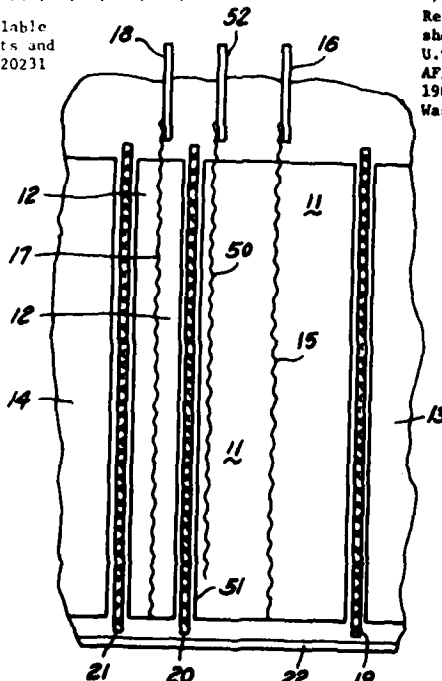
[57]

## ABSTRACT

In a porous electrode primary battery a sensing grid is positioned in a cell on or near the surface of the porous cathode facing the separator and anode. The voltage measured between this sensing grid and the conventional cathode current collector grid is a function of the current distribution within the electrode which is continuously changing as the battery discharges, thus the measured voltage is indicative of the state of charge of the particular cell having the sensing grid and for a battery containing cooperatively connected cells, the state of the battery in general.

## 1 Claim, 10 Drawing Figures

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# PATENT ABSTRACT

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**United States Patent** [19]  
**Hildebrand**

[11] **4,180,329**  
[45] **Dec. 25, 1979**

**[54] SINGLE BLADE PROXIMITY PROBE**

[75] Inventor: **James R. Hildebrand, Palm Beach Gardens, Fla.**

[73] Assignee: **The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

[21] Appl. No.: **889,795**

[22] Filed: **Mar. 23, 1978**

[51] Int. Cl.<sup>2</sup> ..... **G01B 11/14**

[52] U.S. Cl. .... **356/375; 250/224; 356/23; 415/118**

[58] Field of Search ..... **356/372, 373, 375, 426, 356/23; 73/655; 415/118; 250/224, 561; 358/106-108**

**[56] References Cited**

**U.S. PATENT DOCUMENTS**

3,327,584	6/1967	Kissinger	356/375
3,599,002	8/1971	Beutelspacher et al.	356/23 X
3,856,410	12/1974	Swift et al.	356/398
3,908,444	9/1975	Peter	73/71.3
3,917,432	11/1975	Feuerstein et al.	415/118

**FOREIGN PATENT DOCUMENTS**

783524	9/1957	United Kingdom	356/375
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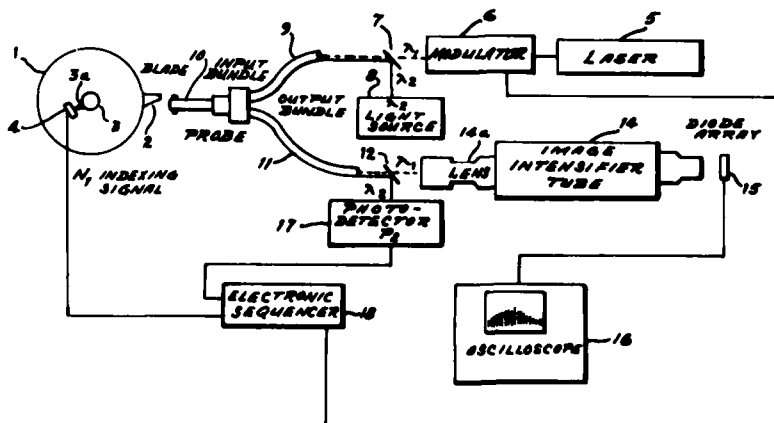
Primary Examiner—F. L. Evans  
Attorney, Agent, or Firm—Joseph E. Rusz; Willard R. Matthews, Jr.

**[57] ABSTRACT**

A single blade proximity probe uses fiber optics to direct a laser output at turbine engine blades and to return the reflected light to an image intensifier probe which provides an output indicative of blade clearance. To enable the system to measure the clearance of a single blade tip on an operating turbine, a second light beam having a different wavelength from the laser output is directed over the laser light path to count the blades and to strobe the laser on the desired blade.

**2 Claims, 1 Drawing Figure**

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JAT 00154



# PATENT ABSTRACT

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## United States Patent [19]

Abraham et al.

[11] 4,180,725

[45] Dec. 25, 1979

### [54] GATING APPARATUS FOR STATIC CROSSED FIELD PHOTOMULTIPLIERS

[75] Inventors: Wayne G. Abraham, Los Altos Hills;  
Richard S. Enck, Jr., San Jose, both  
of Calif.; Ronald H. Goehner, Wayne,  
N.J.; Robert V. Brick, Sunnyvale,  
Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 904,965

[22] Filed: May 11, 1978

[51] Int. Cl.<sup>2</sup> ..... H01J 39/12

[52] U.S. Cl. .... 250/207; 250/213 VT;  
313/95

[58] Field of Search ..... 250/207, 213 VT;  
313/95, 105 R

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,431,420 3/1969 Fisher ..... 250/207

Primary Examiner--David C. Nelms

Assistant Examiner--Darwin R. Hostetter

Attorney, Agent, or Firm--Joseph E. Ruzs; Sherman H.  
Goldman

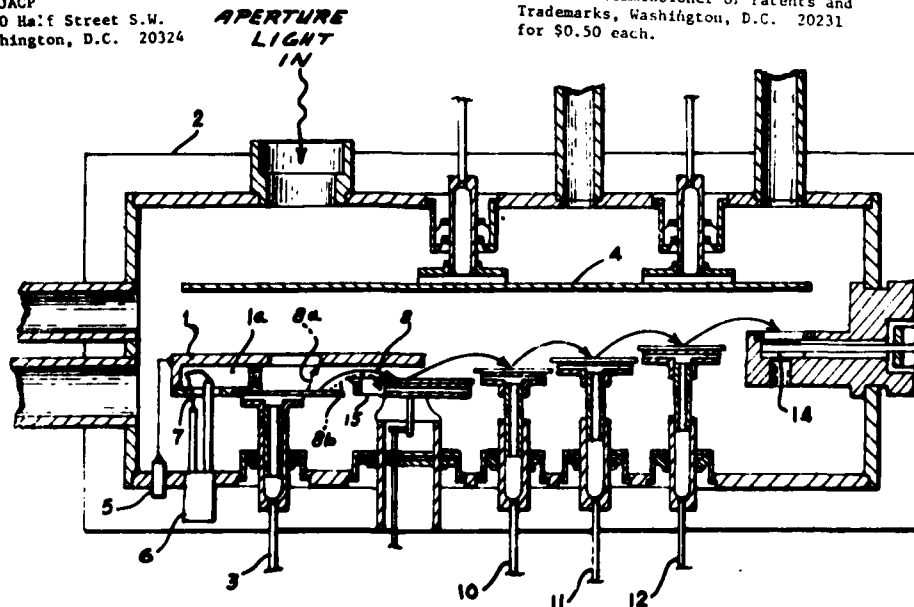
### [57] ABSTRACT

Gating apparatus for a static crossed field photomultiplier utilizes a gating electrode which is mounted in a position between the cathode and the rail electrode. The gating electrode is pulsed thus causing the cathode current to be either multiplied or diverted so as to modulate the current by shifting the cathode beam into and out of the dynode area where secondary amplification occurs.

4 Claims, 1 Drawing Figure

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JAT 00155



# PATENT ABSTRACT

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## United States Patent [19]

Hook et al.

[11] 4,180,779

[45] Dec. 25, 1979

### [54] QPSK DEMODULATOR WITH TWO-STEP QUADRUPLER AND/OR TIME-MULTIPLEXING QUADRUPLING

[75] Inventors: William R. Hook, Los Angeles;  
Ronald P. Hilberg, Redondo Beach,  
both of Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 944,440

[22] Filed: Sep. 21, 1978

[51] Int. Cl.: H04L 27/22

[52] U.S. Cl.: 329/50; 325/320;  
325/346; 329/122

[58] Field of Search 329/50, 104, 110, 122,  
329/124; 325/320, 346, 349

### [56] References Cited

#### U.S. PATENT DOCUMENTS

4,097,813 6/1978 Otani et al. 329/124 X

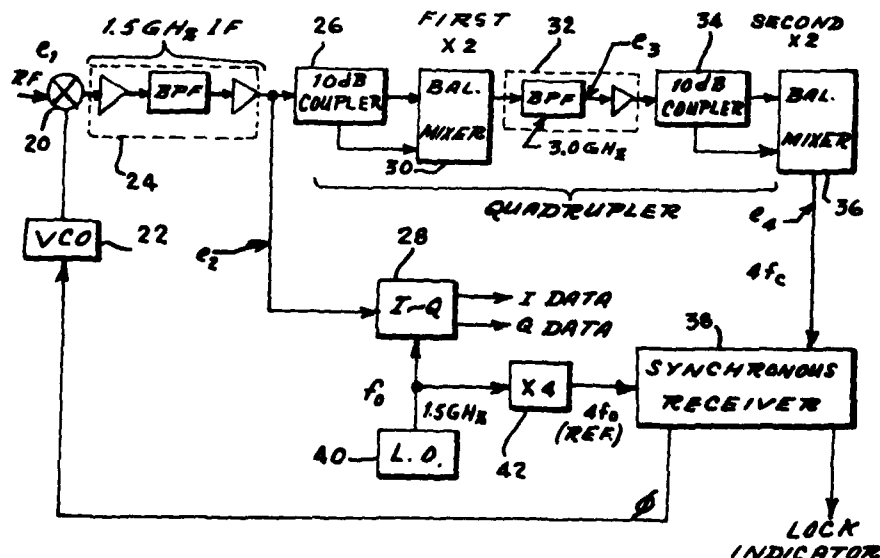
Primary Examiner—Siegfried H. Grimm  
Attorney, Agent, or Firm—Joseph E. Rusz; William  
Stepanishen

### [57] ABSTRACT

A QPSK demodulator apparatus utilizing a pair of doubling units in tandem but separated by a bandpass filter to remove any undesired cross products and to eliminate possible noise signal that may be applied to the second doubler. The use of two doubling units to provide a times 4 quadrupling allows the use of heterodyning in order to operate at a lower frequency.

7 Claims, 7 Drawing Figures

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## United States Patent [19]

Williamson et al.

[11] 4,181,435

[45] Jan. 1, 1980

### [54] HOLOGRAPHIC FIELD LENS DETECTOR

[75] Inventors: Tommy L. Williamson, Kettering;  
Harold W. Rose, Xenia, both of Ohio

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 373,527

[22] Filed: Jun. 29, 1973

[51] Int. Cl.<sup>2</sup> ..... G01B 11/26; G02B 5/18

[52] U.S. Cl. .... 356/141; 350/3.72;  
350/162 ZP; 356/152

[58] Field of Search ..... 356/141, 152; 350/3.5,  
350/162 ZP, 3.72

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,375,750	4/1968	Ellis et al. ....	356/152
3,478,219	11/1969	Nutz ..... ..	356/152
3,701,602	10/1972	Bergin et al. ....	356/152

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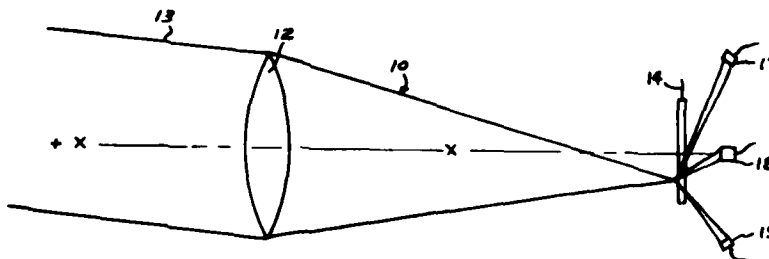
Sincerbox, IBM Tech. Discl. Bulletin, 8-1967, pp. 267, 268.

Primary Examiner—S. C. Buczinski  
Attorney, Agent, or Firm—Joseph E. Ruzs; Richard J. Killoren

### [57] ABSTRACT

A holographic field lens detector system having an objective lens for focusing incoming light from a distant illuminating source upon a holographic lens positioned at the back focal plane of the objective lens. The aperture of the objective lens is simultaneously imaged on four detectors positioned in back of the holographic lens and on the four sides of holographic lens. The output of opposite pairs of detectors are fed to sum and difference circuits with the output of the sum and difference circuits being supplied to divide circuits to provide X and Y position information for the illumination on the holographic lens.

2 Claims, 5 Drawing Figures



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# PATENT ABSTRACT

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## United States Patent [19]

Fujishiro et al.

[11] 4,181,590

[45] Jan. 1, 1980

[54] METHOD OF ION PLATING TITANIUM  
AND TITANIUM ALLOYS WITH NOBLE  
METALS AND THEIR ALLOYS

[75] Inventors: Shiro Fujishiro, Yellow Springs;  
Daniel Eylon, Dayton, both of Ohio

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 941,714

[22] Filed: Sep. 12, 1978

### Related U.S. Application Data

[62] Division of Ser. No. 825,005, Aug. 16, 1977, Pat. No.  
4,137,370.

[51] Int. Cl.<sup>2</sup> ..... C23C 15/00

[52] U.S. Cl. .... 204/192 N; 427/38

[58] Field of Search ..... 204/192 N; 427/38;  
428/670, 672, 674, 660

[56] References Cited

### U.S. PATENT DOCUMENTS

3,514,388 5/1970 Brumfield et al. .... 204/192 N  
3,928,139 12/1975 Takodoro et al. .... 204/192 N

### FOREIGN PATENT DOCUMENTS

1188895 3/1965 Fed. Rep. of Germany ..... 428/670

### OTHER PUBLICATIONS

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Gold," J. Electrochem. Soc. 9/67, pp. 889-892.

Murayama, "Structures of Gold Thin Films Formed by  
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pp. 459-462.

IBM Technical Disclosure Bulletin, vol. 16, No. 1,  
6/73, p. 39, Miller, "Multiple Reflow Ti-Pt Metal-  
lurgy."

Primary Examiner—Arthur J. Steiner  
Attorney, Agent, or Firm—Joseph E. Rusz, Cedric H.  
Kuhn

[57] ABSTRACT

Components fabricated from titanium and titanium al-  
loys are subjected to anion plating with noble metals or  
their alloys. The structures so treated are highly resis-  
tant to oxidation at elevated temperatures and possess  
improved mechanical properties.

3 Claims, No Drawings

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# PATENT ABSTRACT

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## United States Patent [19]

Psarras

[11] 4,181,678

[45] Jan. 1, 1980

[54] SYMMETRICAL PERFLUOROALKYLENE  
OXIDE  $\alpha,\omega$ -DIACYL FLUORIDES

[75] Inventor: Theodore Psarras, Gainesville, Fla.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 942,571

[22] Filed: Sep. 15, 1978

[51] Int. Cl.<sup>2</sup> ..... C07C 53/20; C07C 51/58

[52] U.S. Cl. .... 260/544 F

[58] Field of Search ..... 260/544 F, 543 F

[56]

### References Cited

#### U.S. PATENT DOCUMENTS

3,250,806	5/1966	Warnell .....	260/535
3,317,484	5/1967	Fritz .....	260/78.4
3,318,911	5/1967	Takehara et al. ....	260/340.7
3,862,971	1/1975	Rudolph et al. ....	260/408

Primary Examiner—Gerald A. Schwartz  
Attorney, Agent, or Firm—Joseph E. Rusz; Cedric H.  
Kuhn

[57]

### ABSTRACT

Symmetrical perfluoroalkylene oxide  $\alpha,\omega$ -diacyl fluo-  
ride is prepared by reacting a perfluoroalkylene oxide,  
 $\alpha, \omega$ -diiodide with fuming sulfuric acid in the presence  
of zinc sulfate while adding chlorine.

5 Claims, No Drawings

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**A**BSTRACT

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**United States Patent** [19]

**Psarras**

[11] **4,181,679**

[45] **Jan. 1, 1980**

[54]  **$\omega$ -IODOPERFLUOROALKYLENE OXIDE  
ACYL FLUORIDES**

[75] Inventor: **Theodore Psarras, Gainesville, Fla.**

[73] Assignee: **The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.**

[21] Appl. No: **954,943**

[22] Filed: **Oct. 24, 1978**

[51] Int. Cl.: **C07C 53/20; C07C 51/58**

[52] U.S. Cl.: **260/544 F**

[58] Field of Search: **260/544 F; 260/543 F**

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

3,862,971 1/1975 Rudolph et al. 260/408

*Primary Examiner*—Gerald A. Schwartz  
*Attorney, Agent, or Firm*—Joseph E. Ruzs; Cedric H.  
Kuhn

[57] **ABSTRACT**

$\omega$ -Iodoperfluoroalkylene oxide acyl fluorides are prepared by reacting a perfluoroalkylene oxide  $\alpha,\omega$ -diiodide with fuming sulfuric acid in the presence of zinc sulfate. The iodoacyl fluorides are intermediates for use in synthesizing perfluoroalkylene ether diimide esters.

**4 Claims, No Drawings**

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**JAT 00160**



# PATENT ABSTRACT

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## United States Patent [19]

Evers et al.

[11] 4,181,681

[45] Jan. 1, 1980

[54] 2-AMINO-4-ETHYNYLPHENOL

[75] Inventors: Robert C. Evers; George J. Moore,  
both of Dayton, Ohio

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 925,899

[22] Filed: Jul. 19, 1978

[51] Int. Cl.<sup>2</sup> ..... C07C 91/44

[52] U.S. Cl. .... 260/575; 528/210

[58] Field of Search ..... 260/575, 578, 571;  
528/210

[56] References Cited

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3,700,743	10/1972	Relles	260/668 R
3,928,450	12/1975	Bilow et al.	260/571
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Schofield et al., "Chemical Abstracts", vol. 44, Ab. No.  
2992g (1950).

Cook et al., "Chemical Abstracts", vol. 58, Ab. No.  
12390d (1963).

Primary Examiner—John Doll

Attorney, Agent, or Firm—Joseph E. Rusz; Cedric H.  
Kuhn

[57]

### ABSTRACT

2-Amino-4-ethynylphenol, a novel compound, is prepared by a four-step synthetic sequence in which the key reaction is the treatment of 4-acetoxy-3-nitroacetophenone with a Vilsmeier reagent derived from N,N-dimethylformamide and phosphorus oxychloride. The compound is useful as an endcapping agent in the synthesis of fluorocarbon ether bibenzoxazole oligomers which, because of the presence of acetylenic terminal groups, can be cured by thermal means to provide broad-use temperature, fuel and fluid resistant vulcanizates.

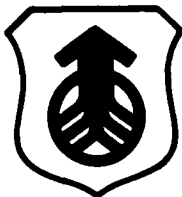
2 Claims, No Drawings

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JAT 00161



# PATENT ABSTRACT

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**United States Patent** [19]

**Wendt et al.**

[11]

**4,181,774**

[45]

**Jan. 1, 1980**

[54] **ELECTROMAGNETIC INTERFERENCE  
FILTER WINDOW**

[75] **Inventors:** Jerry P. Wendt, Arcadia, Calif.;  
Andrew J. Steckl, Ballston Spa, N.Y.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 970,947

[22] **Filed:** Dec. 19, 1978

[51] **Int. Cl.<sup>2</sup>** ..... B32B 17/06; C03C 17/22

[52] **U.S. Cl.** ..... 428/335; 204/192 P;  
350/164; 350/311; 350/1.6; 331/94.5 G;  
427/162; 427/165; 428/34; 428/433; 428/469

[58] **Field of Search** ..... 428/335, 332, 469, 34,  
428/433; 427/162, 165; 204/192 P; 350/1, 164,  
311; 331/94.5 G

[56]

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3,671,286	6/1972	Fischell	428/332
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3,920,533	11/1975	Pompei	204/192 P
3,935,351	1/1976	Franz	428/34
3,958,042	5/1976	Katsube et al.	427/162

*Primary Examiner*—Herbert, Jr., Thomas J.

*Attorney, Agent, or Firm*—Joseph E. Ruzs; William J. O'Brien

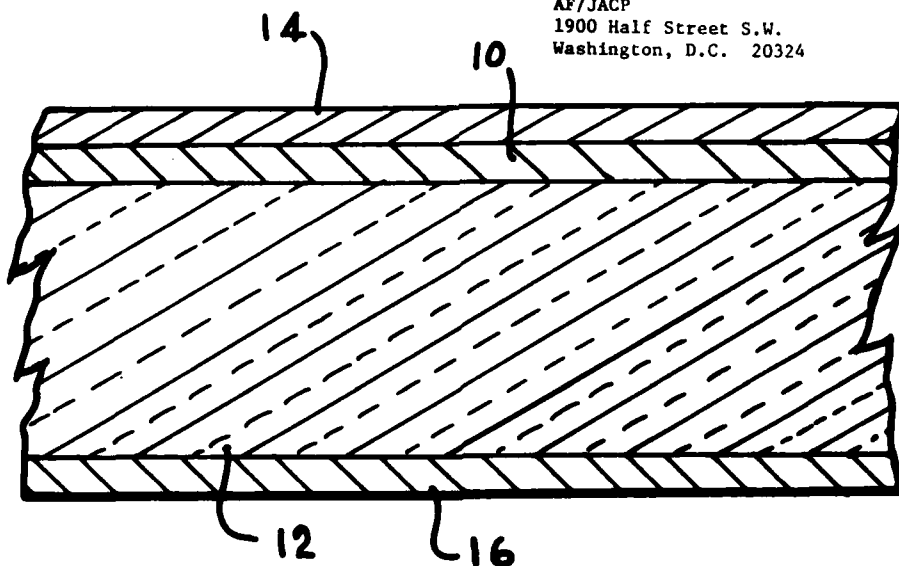
[57]

## ABSTRACT

A laser window material for use in the infrared wave-length spectrum comprising a glass substrate having an indium tin oxide conductive film deposited in one surface thereof and magnesium fluoride antireflection films deposited atop the conductive film and the opposite surface of the glass substrate.

**3 Claims, 1 Drawing Figure**

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# PATENT ABSTRACT

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United States Patent (19)

(11) 4,183,027

Ehrenspeck

(45) Jan. 8, 1980

[54] DUAL FREQUENCY BAND DIRECTIONAL  
ANTENNA SYSTEM

[76] Inventor: Hermann W. Ehrenspeck, 94  
Farham St., Belmont, Mass. 02178

[21] Appl. No.: 935,048

[22] Filed: Aug. 18, 1978

## Related U.S. Application Data

[63] Continuation of Ser. No. 840,449, Oct. 7, 1977, abandoned.

[51] Int. Cl.: H01Q 3/00

[52] U.S. Cl.: 343/726; 343/789

[58] Field of Search: 343/726, 725, 727, 728,  
343/789, 837, 834-836, 817, 819

[56] References Cited

## U.S. PATENT DOCUMENTS

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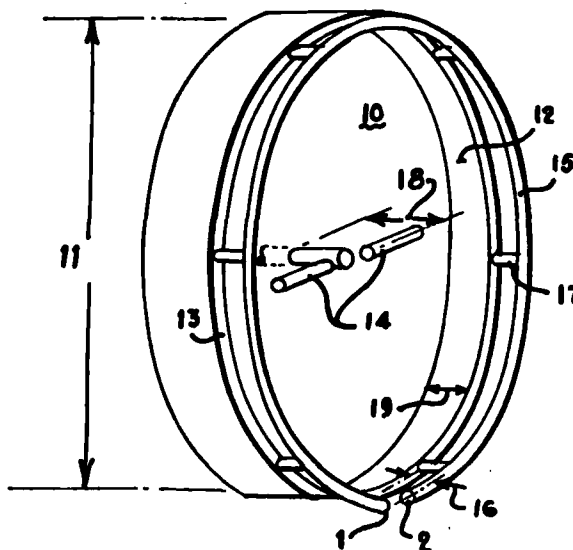
Termon's Electronic and Radio Engineering, 4th Edition, McGraw Hill, 1955, pp. 907 and 908.

Primary Examiner—David K. Moore  
Attorney, Agent, or Firm—Joseph E. Ruz; George Fine

## ABSTRACT

A dual frequency band directional antenna or system in the form of a cavity reflector antenna mechanically combined and radiation-coupled with a loop of approximately the same shape and periphery as the rim edge of the cavity reflector, which loop is arranged outside and in front of, and in close proximity and parallel to the cavity rim edge, and, when properly energized, acts for the lower frequency band as a loop radiator with preselected field polarization, whereby the entire cavity structure serves two purposes by acting simultaneously as reflector for the higher frequency band cavity reflector antenna and for the lower frequency band, electrically separate loop radiator, with the radiation patterns of both sources being unidirectional over both frequency bands and with their radiation maxima directed into the center axis normal to the bottom plate of the cavity reflector structure.

17 Claims, 9 Drawing Figures



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## United States Patent [19]

Mullally

[11] 4,184,125

[45] Jan. 15, 1980

### [54] ANALOG TUNING VOLTAGE CIRCUIT WITH ANALOG SIGNAL MULTIPLEXING

[75] Inventor: James F. Mullally, Apalachin, N.Y.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 922,601

[22] Filed: Jul. 7, 1978

[51] Int. Cl. H03G 3/00

[52] U.S. Cl. 330/282; 330/51;

330/84; 330/86; 330/295

[58] Field of Search 330/51, 84, 86, 110,  
330/282, 295; 328/103, 154

### [56] References Cited U.S. PATENT DOCUMENTS

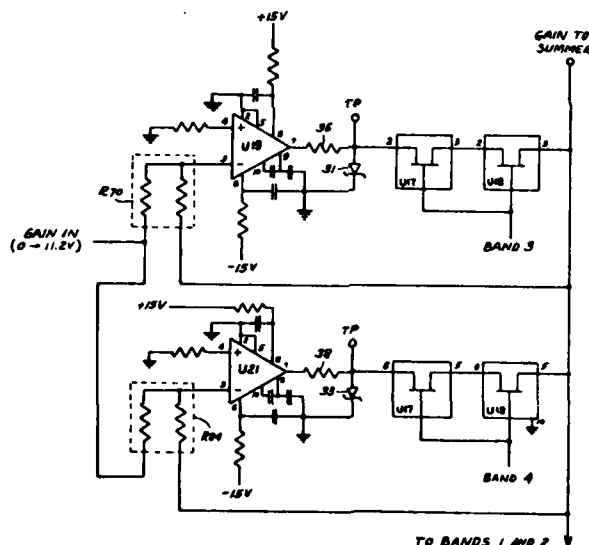
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3,500,316	3/1970	Brown	330/86
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3,662,275	5/1972	Riley	330/51 X

Primary Examiner—James B. Mullins  
Attorney, Agent, or Firm—Joseph E. Ruz; Robert Kern  
Duncan

### [57] ABSTRACT

Disclosed is an analog tuning circuit, suitable for multi-  
plexing, having a field-effect transistor connected to the  
output of an operational amplifier with the drain connected in  
a feedback loop to the inverting input of the  
amplifier.

1 Claim, 4 Drawing Figures



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## United States Patent [19]

Smolinski et al.

[11] 4,184,821

[45] Jan. 22, 1980

### [54] HIGH VELOCITY ROTARY VANE COOLING SYSTEM

[76] Inventors: Ronald E. Smolinski, 4081 Forest Ridge Blvd., Dayton, Ohio 45424; Kenneth P. Schwartz, 2604 N. Emerald, Fairborn, Ohio 45324

[21] Appl. No.: 932,812

[22] Filed: Aug. 10, 1978

[51] Int. Cl.<sup>2</sup> ..... F04C 29/02

[52] U.S. Cl. .... 418/93; 418/152; 418/264

[58] Field of Search ..... 418/152, 264

### [56] References Cited

#### U.S. PATENT DOCUMENTS

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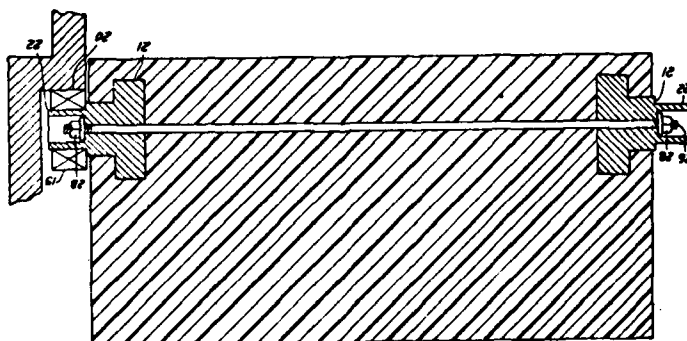
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4,088,426	5/1978	Edwards	418/152 X

Primary Examiner—Leonard E. Smith  
Attorney, Agent, or Firm—Joseph E. Rusz; Richard J. Killoren

### [57] ABSTRACT

A reverse Brayton cycle rotary vane cooling system having a compressor and an expander driven by a common shaft. The cooling system includes a plurality of vanes made of a carbon epoxy plastic composite with bearing support inserts molded into the plastic composite. A bolt passes through the bearing support inserts and plastic composite. Oil is supplied to the vane slots with any oil passing into the cooling gas being removed by oil separators.

3 Claims, 3 Drawing Figures



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United States Patent [19]

[11] 4,184,896

Millen

[45] Jan. 22, 1980

[54] SURFACE BARRIER TAILORING OF SEMICONDUCTOR DEVICES UTILIZING SCANNING ELECTRON MICROSCOPE PRODUCED IONIZING RADIATION

[75] Inventor: Michael F. Millen, Manhattan Beach, Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 913,186

[22] Filed: Jan. 6, 1978

[51] Int. Cl. H01L 21/36; H01L 21/324; H01L 29/78

[52] U.S. Cl. 148/1.5; 29/576 B; 250/492 A; 357/23; 357/29; 357/52; 357/91

[58] Field of Search 148/1.5; 250/492 A; 250/492 B; 29/576 B; 357/29, 52, 91, 24, 23; 427/35

[56] References Cited

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3,755,092	8/1973	Astula	204/35 N
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Broers et al., "Microcircuits by Electron Beam", Scientific American, Nov. 1972, pp. 34-44.

Bhatia et al., "Irradiation Technique . . . Charge-Coupled Storage Cell", I.B.M. Tech. Disc. Bull., vol. 15, No. 3, Aug. 1972, pp. 723-724.

Primary Examiner—L. Dewayne Rutledge

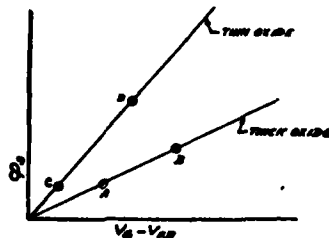
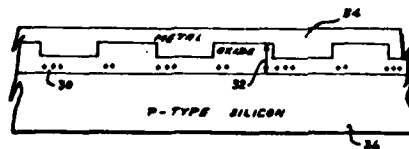
Assistant Examiner—W. G. Saba

Attorney, Agent, or Firm—Joseph E. Ruz; Henry S. Miller

## ABSTRACT

A method of spatially tailoring the surface barrier of MOS devices by means of a scanning electron microscope using ionizing radiation at the silicon dioxide-silicon interface to control the surface charge distribution. The MOS is subsequently annealed at about 300° C. for several hours to stabilize the surface potential.

1 Claim, 5 Drawing Figures



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**United States Patent** [19]

[11] **4,185,031**

**Gillman et al.**

[45] **Jan. 22, 1980**

[54] **FLUORINATED PHOSPHINIC ACIDS**

[56]

**References Cited**

[75] **Inventors:** Hyman D. Gillman, East Vincent Township, Chester County; James P. King, Upper Gwynedd Township, Montgomery County, both of Pa.

**U.S. PATENT DOCUMENTS**

3,719,448 3/1973 Chance et al. .... 260/502.4 R

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1443533 3/1969 Fed. Rep. of Germany .... 260/502.4 R

[73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

*Primary Examiner*—Joseph E. Evans  
*Attorney, Agent, or Firm*—Joseph E. Ruzs; Cedric H. Kuhn

[21] **Appl. No.:** 946,265

[57]

**ABSTRACT**

[22] **Filed:** Sep. 27, 1978

Fluorinated phosphinic acids prepared by reaction of fluorinated olefins with an acid containing one or more P-H bonds in the presence of a free radical initiator. The reaction products of the acids with various metal centers are effective grease thickeners for liquid lubricants.

[51] **Int. Cl.:** ..... C07F 9/30; C10M 1/44

[52] **U.S. Cl.:** ..... 260/502.4 R; 252/42.7; 260/429.3; 260/429.5; 260/438.5 R; 260/439 R

[58] **Field of Search** ..... 260/502.4 R

**4 Claims, No Drawings**

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## United States Patent [19]

Griffin

[11] 4,185,041

[45] Jan. 22, 1980

### [54] CHANNEL SEALANT COMPOSITIONS

[75] Inventor: Warren R. Griffin, Dayton, Ohio

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 830,227

[22] Filed: Sep. 2, 1977

[51] Int. Cl.: C08L 85/02; C08L 83/08; C08L 75/04

[52] U.S. Cl.: 525/188; 525/474

[58] Field of Search: 260/824 R, 823, 2.3, 260/858; 106/33

### [56] References Cited

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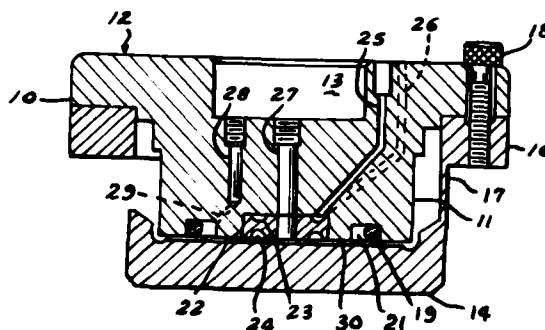
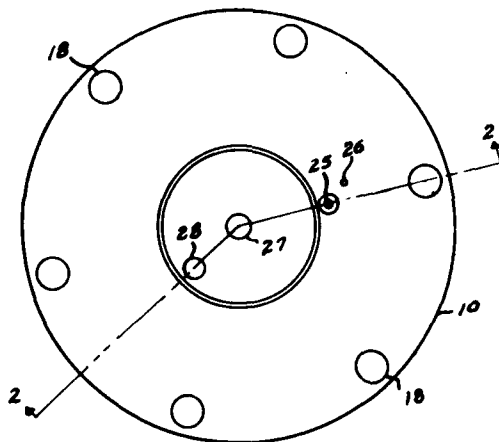
Primary Examiner—Wilbert J. Briggs, Sr.  
Attorney, Agent, or Firm—Joseph E. Russ; Cedric H. Kuhn

### [57]

#### ABSTRACT

A sealant composition comprising a non-crosslinked, elastomeric mastic and an extrusion-inhibiting amount of vulcanized rubber particles of irregular shape and having sharp edges and angular surfaces. When the composition is used as a channel sealant, the ability of the particles to deform at structural gaps while offering resistance to extrusion prevents the loss of the elastomeric mastic.

6 Claims, 2 Drawing Figures



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## United States Patent [19]

Harrison, Jr.

[11] 4,185,247

[45] Jan. 22, 1980

### [54] MEANS FOR REDUCING SPURIOUS FREQUENCIES IN A DIRECT FREQUENCY SYNTHESIZER

[75] Inventor: Ernest R. Harrison, Jr.,  
Crownsville, Md.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No. 866,743

[22] Filed Jan. 3, 1978

[51] Int. Cl. H03K 13/32

[52] U.S. Cl. 328/165; 328/14

[58] Field of Search 328/14, 155, 165

#### [56] References Cited

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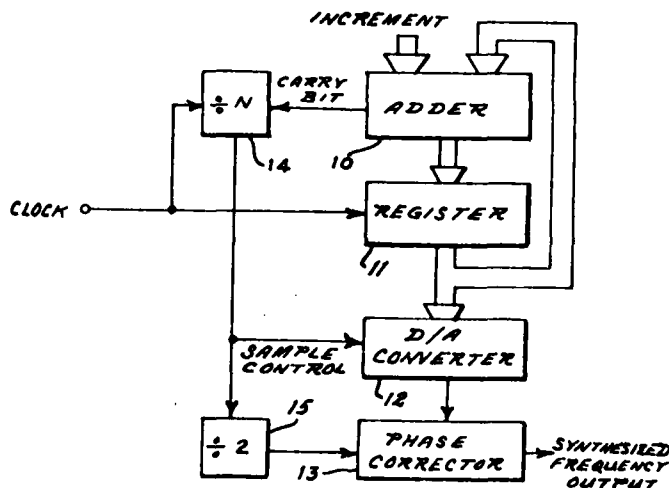
Primary Examiner—John S. Heyman

Attorney, Agent, or Firm—Joseph E. Rusz; George Fine

#### [57] ABSTRACT

Spurious frequencies are eliminated in a direct frequency synthesizer by means of a feed forward correction circuit. The improved direct frequency synthesizer of the invention includes a series adder, clocked register, a D/A converter and a phase corrector. The adder is inputted by a digital control increment and the output of the register. The system clock frequency is divided down by a smoothing counter that in part controls the phase of the output signal. Spurious frequencies are manifested by overflow of the register. The register overflow is converted to an analog signal by the D/A converter. The system output is provided by a voltage controlled oscillator that is controlled by an amplifier which is responsive to both the smoothing counter output and the analog output of the D/A converter. Additionally, the D/A converter is sampled twice for every cycle of output frequency, resulting in a doubling of the output frequency for a given D/A converter.

2 Claims, 4 Drawing Figures



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## United States Patent [19]

Ernst

[11] 4,185,458

[45] Jan. 29, 1980

### [54] TURBOFAN AUGMENTOR FLAMEHOLDER

[75] Inventor: Richard C. Ernst, North Palm Beach, Fla.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 904,850

[22] Filed: May 11, 1978

[51] Int. Cl.: F02G 3/00

[52] U.S. Cl.: 60/261; 60/39 72 R

[58] Field of Search: 60/261, 39.72 R

#### [56] References Cited

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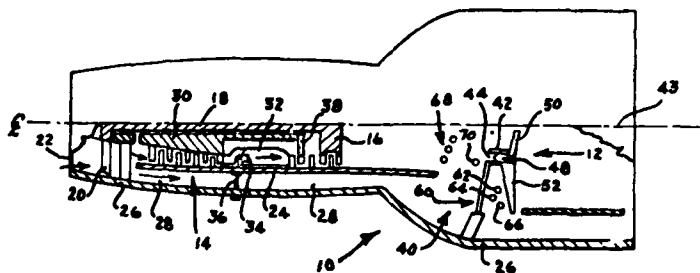
Primary Examiner—Douglas Hart

Attorney, Agent, or Firm—Joseph E. Ruz; Jacob N. Erlich

#### [57] ABSTRACT

A turbofan augmentor flameholder having a hollow ring-like structure of annular configuration concentric with the center line of a turbine of a turbofan engine. The ring-like structure has protruding therefrom in the radial direction a first group of hollow gutters extending in a direction toward the center line of the turbine and a second group of hollow gutters extending from the ring-like structure in a direction away from the center line and toward the outer casing of the turbofan engine. The second group of gutters have a vee-shaped angular configured portion in a direction toward the turbine. The angular configured portion gradually increases in angle along the gutter in the radial direction as a direct function of its distance from the ring-like structure. Such a relationship provides optimum efficiency for the dispersion of hot exhaust gases from the turbine to the flameholder for gas turbofan engine augmentation.

3 Claims, 4 Drawing Figures



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**United States Patent** [19]  
**Wilkinson**

[11] **4,185,461**  
[45] **Jan. 29, 1980**

**[54] TURBOJET ENGINE WITH COMBUSTOR BYPASS**

[75] Inventor: David B. Wilkinson, Xenia, Ohio  
[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 868,399  
[22] Filed: Jan. 10, 1978  
[51] Int. Cl.<sup>1</sup> ..... F02K 3/10; F02K 1/02  
[52] U.S. Cl. .... 60/261; 60/262; 60/19.23  
[58] Field of Search ..... 60/261, 262, 247, 284, 60/39.67, 39.21, 39.23, 39.37

**References Cited**

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2,693,674	11/1954	Anxionnaz et al.	60/262
2,946,185	7/1960	Bayer	60/262
3,045,425	7/1962	Seifferlein	60/261
3,486,338	12/1969	Hausmann et al.	60/262

**FOREIGN PATENT DOCUMENTS**

925984	3/1955	Fed. Rep. of Germany	60/262
615277	1/1961	Italy	60/262

**OTHER PUBLICATIONS**

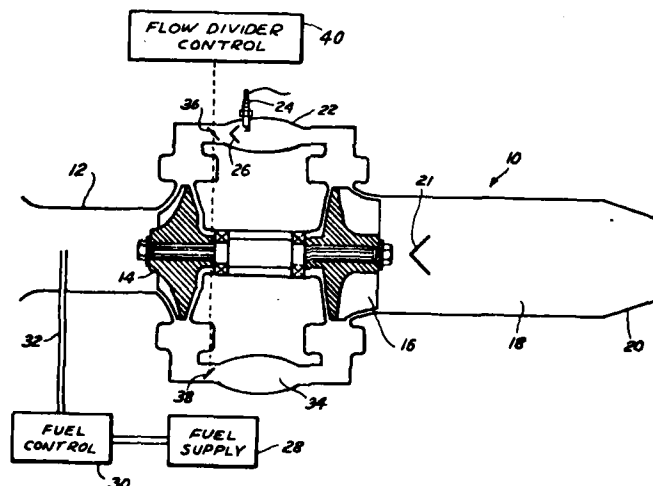
Hill et al., *Mechanics and Thermodynamics of Propulsion*, 1965, pp. 216-217.

*Primary Examiner*—Carlton R. Croyle  
*Assistant Examiner*—Thomas I. Rosa  
*Attorney, Agent, or Firm*—Joseph E. Rusz; Richard J. Killoren

**[57] ABSTRACT**

A propulsion system having an afterburning turbojet with the fuel supplied at the inlet to the turbojet compressor. The turbojet combustor has a bypass with a flow control connected at the inlets to the combustor and the bypass to control the amount of fuel-air mixture from the compressor that enters the combustor.

2 Claims, 1 Drawing Figure



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# PATENT ABSTRACT

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United States Patent [19]

[11] 4,185,558

Quinville

[45] Jan. 29, 1980

[54] RE-ENTRY VEHICLE BOUNDARY LAYER  
TRANSITION SUPPRESSOR

[56]

## References Cited

### U.S. PATENT DOCUMENTS

[75] Inventor James A. Quinville, Redlands, Calif

3,129,667 4/1964 Wen 102/105

[73] Assignee The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

Primary Examiner—Verlin R. Pendegram  
Attorney, Agent, or Firm—Joseph E. Ruzs, Richard J.  
Killoren

[21] Appl No. 725,582

[57]

## ABSTRACT

[22] Filed Apr. 23, 1968

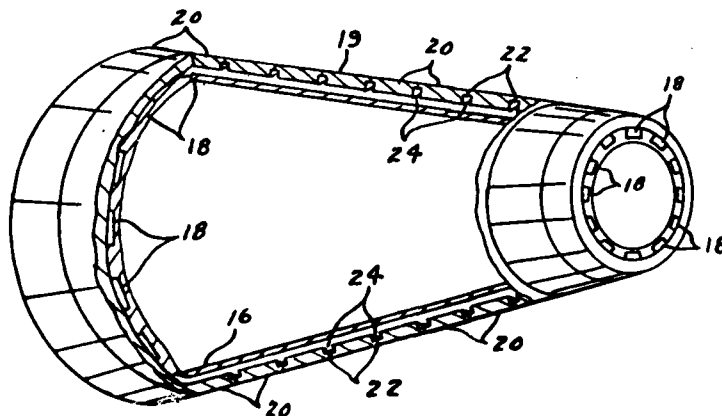
Boundary layer transition is delayed on a re-entry vehicle by making use of the differential pressure that normally exists between the surface of a re-entry vehicle and the base region of the vehicle. Choked flow orifices are provided on the surface of the vehicle at the input to the internal ducting leading to the base region of the vehicle.

[51] Int. Cl.<sup>2</sup> B64C 1/38

[52] U.S. Cl. 102/105; 244/160

[58] Field of Search 102/105; 244/117.1,  
244/123, 160

1 Claim, 6 Drawing Figures



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JAT 00172



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## United States Patent [19]

[11] 4,185,858

Peash

[45] Jan. 29, 1980

### [54] SECONDARY SEAL FOR TUBING JOINED VIA V-BAND COUPLINGS

[75] Inventor: Douglas E. Peash, Enum Claw,  
Wash

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 920,867

[22] Filed: Jan. 28, 1978

[51] Int. Cl.: F16L 23/04

[52] U.S. Cl.: 285/367; 277/236;  
285/DIG. 18

[58] Field of Search: 285/367, 366, 365, DIG. 18,  
285/233, 234; 277/236

#### [56] References Cited

##### U.S. PATENT DOCUMENTS

1,863,122	6/1932	Matthews	285/367 X
2,050,137	8/1936	Walsh	285/DIG. 18 X
2,489,587	11/1949	Rice	285/367
3,235,293	2/1966	Condon	285/367 X
3,464,722	9/1969	Larkin	285/367
3,563,571	2/1971	Werra	285/367 X

3,762,746	10/1973	Amada	285/367 X
3,822,075	7/1974	Duncan	285/367

#### FOREIGN PATENT DOCUMENTS

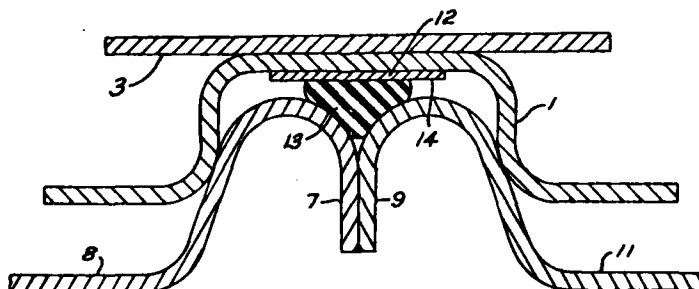
2638018 3/1977 Fed. Rep. of Germany 285/DIG. 18

Primary Examiner—Thomas F. Callaghan  
Attorney, Agent, or Firm—Joseph E. Rusz; James S.  
Shannon; Casimer K. Salya

#### [57] ABSTRACT

A device for sealing the joint between ducts having sheet metal flanges mated with V-band couplings. Seal assemblies are interposed between the V-band coupling and the abutting duct flanges. As the V-band coupling is tightened to draw the ends of the duct flanges together the seal assembly is compressed, deforming the sealing material in contact with the duct flanges and effectuating a tight seal therebetween. A variety of seal assembly configurations are contemplated including those of continuous or segmented structure, those having compressible resilient materials or ductile metals as sealing materials, and those having a support band bonded to the sealing material for added structural rigidity.

2 Claims, 8 Drawing Figures



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JAT 00173



# PATENT ABSTRACT

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United States Patent [19]  
Williamson et al.

[11] 4,185,919  
[45] Jan. 29, 1980

## [54] QUADRANT DETECTION SYSTEM

[75] Inventors: Tommy L. Williamson, Kettering;  
Harold W. Rose, Xenia, both of Ohio

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 369,030

[22] Filed: Jun. 8, 1973

[51] Int. Cl.<sup>1</sup> G01B 11/26; G02B 5/18

[52] U.S. Cl. 356/141; 350/3.72;

350/162 ZP; 356/152

[58] Field of Search 356/141, 152; 350/3.3,

350/162 ZP, 3.72

## [56] References Cited

### U.S. PATENT DOCUMENTS

3,375,750 4/1968 Ellis et al. 356/152  
3,701,602 10/1971 Bergs et al. 356/152

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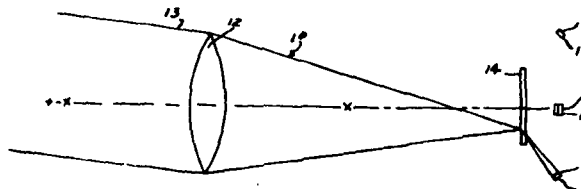
Sincerbox, IBM Tech. Discl. Bulletin, 8-1967, pp. 267,  
268.

Primary Examiner—S. C. Buczinski  
Attorney, Agent, or Firm—Joseph E. Rusz; Richard J.  
Killoren

## [57] ABSTRACT

A quadrant detection system having an objective lens  
and a holographic lens positioned at the back focal  
plane of the objective lens. Four photoelectric detectors  
are positioned on the side of the holographic lens re-  
mote from the objective lens. The holographic lens has  
lens elements in four quadrants with each quadrant  
having a focal point corresponding to the position of the  
photoelectric detectors.

2 Claims, 5 Drawing Figures



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# PATENT ABSTRACT

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## United States Patent [19]

Picklesimer et al.

[11] 4,187,359

[45] Feb. 5, 1980

### [54] ACETYLENE-TERMINATED POLYIMIDE COMPOSITIONS

[76] Inventors: **Lewellyn G. Picklesimer**, 3765 Winthrop Dr., Dayton, Ohio 45431;  
**Michael A. Lacarelli**, 175 Old Dayton Yellow Springs Rd., Fairborn, Ohio 45324; **Theodore J. Reinhart, Jr.**, 345 Forrer Blvd., Dayton, Ohio 45419

[21] Appl. No.: 967,049

[22] Filed: Dec. 6, 1978

[51] Int. Cl.<sup>2</sup> ..... C08L 77/10

[52] U.S. Cl. .... 525/6; 260/45.9 K;

260/45.9 KA; 528/125; 528/434

[58] Field of Search ..... 526/6, 15, 52; 528/177, 528/178, 125; 260/45.9 K, 45.9 KA

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,845,018	10/1974	Bilow et al.	528/178
3,864,309	2/1975	Bilow et al.	528/178
3,897,395	7/1975	D'Alelio	528/178
4,098,767	7/1978	Bilow	528/178

Primary Examiner—Lester L. Lee

Attorney, Agent, or Firm—Joseph E. Rusz; Cedric H. Kuhn

### [57] ABSTRACT

A composition of matter comprising an acetylene-terminated polyimide oligomer and trinitriloacetonitrile. The composition has a retarded cure rate, thereby facilitating the fabrication of void-free molded objects and composites.

3 Claims, No Drawings

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United States Patent [19]

[11]

4,187,692

Midolo

[45]

Feb. 12, 1980

[54] LIQUID COOLED ROTARY VANE AIR  
CYCLE MACHINE

[76] Inventor: Lawrence L. Midolo, 1475 Black Oak  
Dr., Centerville, Ohio 45459

[21] Appl. No.: 902,524

[22] Filed: May 3, 1978

[51] Int. Cl.<sup>2</sup> ..... F25D 9/00

[52] U.S. Cl. .... 62/402; 123/119 CD;  
418/85

[58] Field of Search ..... 62/86, 402, 499, 505;  
418/83, 85, 86; 123/119 CD

[56] References Cited

## U.S. PATENT DOCUMENTS

3,424,135	1/1969	Tado	418/86
3,884,664	5/1975	Edwards	62/402
4,117,695	10/1978	Hargreaves	62/86

Primary Examiner—Ronald C. Capossela

Attorney, Agent, or Firm—Joseph E. Rusz; Richard J. Killoren

[57] ABSTRACT

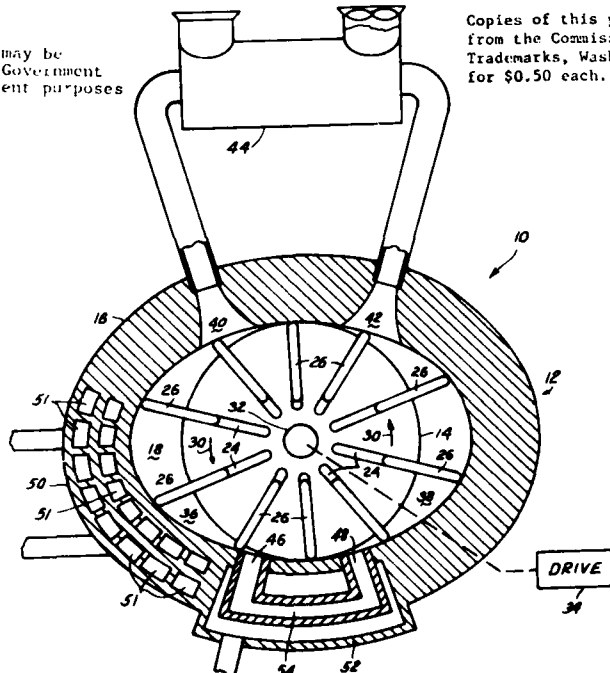
An air cooling system having a rotary assembly within a non-circular chamber wherein compression and expansion used in a modified reverse Brayton cycle are provided within the same chamber by the change in volume brought about by vanes sliding within slots in the rotor. Air is supplied to the compressor portion of the chamber from an air-to-air heat exchanger which receives cooled air from the expander. A transfer passage is provided between the output of the compressor and the inlet of the expander. A liquid cooled heat exchanger is provided adjacent the compressor. A second liquid cooled heat exchanger is provided around the transfer passage. Coolant is supplied to the liquid cooled heat exchangers from a radiator.

1 Claim, 4 Drawing Figures

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# PATENT ABSTRACT

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## United States Patent [19]

[11] 4,187,693

Smolinski

[45] Feb. 12, 1980

[54] CLOSED CHAMBER ROTARY VANE GAS  
CYCLE COOLING SYSTEM

[76] Inventor: Ronald E. Smolinski, 4081 Forest  
Ridge, Dayton, Ohio 45424

[21] Appl. No.: 915,707

[22] Filed: Jan. 15, 1978

[31] Int. Cl. F25D 9/00

[52] U.S. Cl. 62/402; 418/85;  
123/119 CD

[58] Field of Search 62/402, 499, 86;  
418/85, 86; 123/119 CD

[56] References Cited

### U.S. PATENT DOCUMENTS

1,686,893 8/1972 Edwards 62/402  
4,021,163 5/1977 Morita et al. 418/83  
4,117,695 10/1978 Hargreaves 62/499

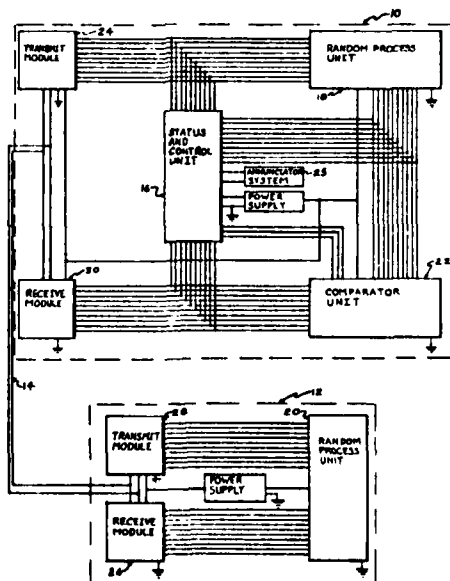
Primary Examiner—Ronald C. Caposela

Attorney, Agent, or Firm—Joseph E. Ruz; Richard J.  
Killoren

### ABSTRACT

A gas cycle cooling system having a rotary compressor and expander driven by a common shaft wherein the compression and expansion of a modified reverse Brayton cycle is provided within a closed chamber by changes in volume brought about by vanes sliding within slots in a rotor. The rotor is positioned within the chamber to provide spaces between the rotor and the chamber wall which act as effective gas transfer passages between the compressor and the expander. Liquid from a first heat exchanger is circulated through the wall of the rotor housing adjacent the compressor portion of the chamber to remove heat during the compressor phase of the cycle. Liquid is circulated through the wall of the rotor housing adjacent the expander portion of the chamber to provide cooling for a second heat exchanger.

5 Claims, 2 Drawing Figures



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# PATENT ABSTRACT

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## United States Patent [19]

[11] 4,187,694

Midolo

[45] Feb. 12, 1980

### [54] BINARY WORKING FLUID AIR CONDITIONING SYSTEM

[76] Inventor: Lawrence L. Midolo, 1475 Black Oak  
Dr., Centerville, Ohio 45459

[21] Appl. No.: 962,742

[22] Filed: Nov. 21, 1978

[51] Int. Cl.<sup>2</sup> ..... F25D 9/00

[52] U.S. Cl. .... 62/402; 62/323;  
123/119 CD; 60/618

[58] Field of Search ..... 62/402, 323;  
123/119 CD; 60/618

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,228,189	1/1966	Baker	60/618
3,252,298	5/1966	Andrews	62/402
3,350,876	11/1967	Johnson	60/618
3,668,884	6/1972	Nebgen	62/402
3,713,294	1/1973	Balje et al.	62/402
3,830,062	8/1974	Morgan et al.	60/618
3,967,466	7/1976	Edwards	62/402

3,968,649	7/1976	Edwards	62/402
4,017,285	4/1977	Edwards	62/402
4,069,672	1/1978	Milling	60/618

Primary Examiner—Ronald C. Capossela  
Attorney, Agent, or Firm—Joseph E. Ruzs; Richard J.  
Killoren

[57]

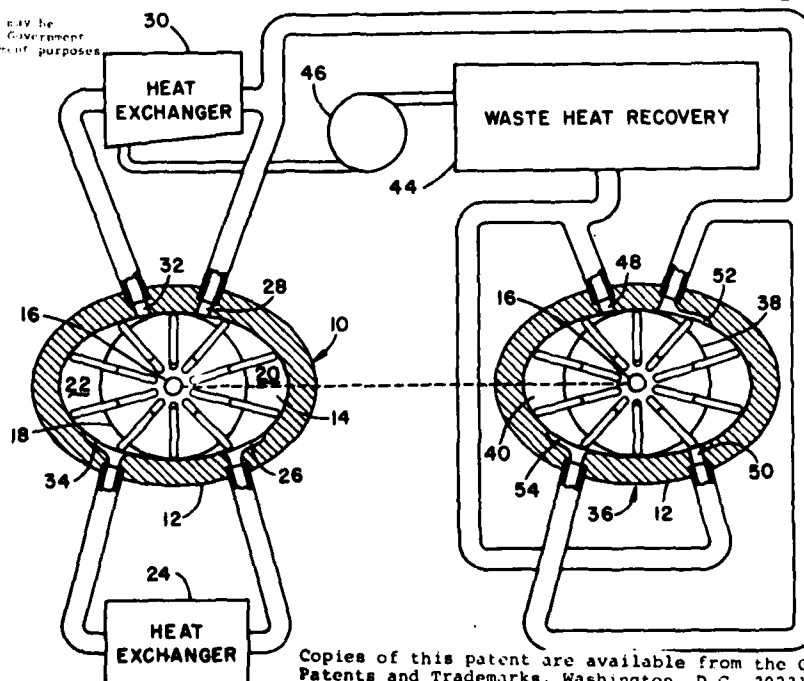
### ABSTRACT

An air conditioning system for vehicles having a reverse Brayton cycle cooling system with a turbine drive for the rotor in the reverse Brayton cycle cooling system. A binary working fluid is used in the air conditioning system with air used in the reverse Brayton cycle cooling system. Waste heat is used to provide superheated water vapor for driving the turbine with the turbine return supplied to the air flow at the outlet of the compressor of the cooling system. The combined working fluid is supplied to a heat rejection heat exchanger where the excess water vapor is condensed and returned to the waste heat recovery system.

9 Claims, 4 Drawing Figures

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# PATENT ABSTRACT

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## United States Patent [19]

Siegman et al.

[11] 4,188,591

[45] Feb. 12, 1980

### [54] RF EXCITED MERCURY LASER LAMP

[75] Inventors: Anthony E. Siegman; Neil C. Holmes, both of Stanford; Max T. Artusy, Mt. View, all of Calif.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 840,353

[22] Filed: Oct. 7, 1977

[51] Int. Cl.<sup>2</sup> ..... H01S 3/092

[52] U.S. Cl. .... 331/94.5 P; 313/220

[58] Field of Search ..... 331/94.5 P, 94.5 D, 331/94.5 G, 94.5 R; 313/220

### [56] References Cited

#### U.S. PATENT DOCUMENTS

3,535,653	10/1970	Zarowin	331/94.5 G
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3,659,220	4/1972	Erickson	331/94.5 G
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Bell, "Ring Discharge Excitation of Gas Ion Lasers", *Applied Physics Letters*, vol. 7, No. 7, Oct. 1, 1965, pp. 190-191.

Huchital et al., "Pumping of Nd:YAG with Electrode-

less Arc Lamps", *IEEE J. of Quantum Electronics*, vol. QE-12, No. 1, Jan. 1976, pp. 1-3.

Sinclair et al., *Gas Laser Technology*, Holt, Rinehart and Winston, Inc., N. Y., 1969, pp. 129, 130, 141-145.

Goldsborough et al., RF "Induction Excitation of CW Visible Laser Transitions in Ionized Gases", *App. Phys. Lett.* vol. 8, No. 6, Mar. 15, 1966, pp. 137-139.

Artusy et al., "DC-Excited and Sealed-Off Operation of the Optically Pumped 546.1-nm Hg Laser", *App. Phys. Lett.*, vol. 28, No. 3, Feb. 1, 1976, pp. 133-134.

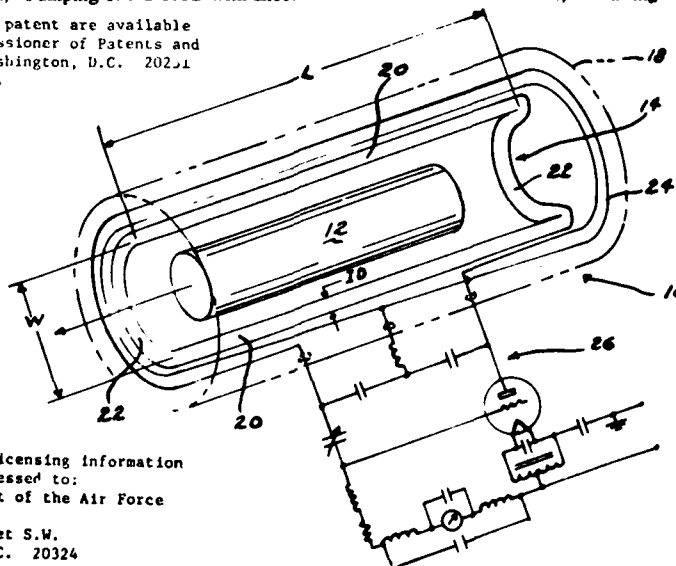
Primary Examiner—James W. Davie

Attorney, Agent, or Firm—Joseph E. Rusz; Jacob N. Erlich

### [57] ABSTRACT

An optically pumped laser wherein the optical pumping means is in the form of a mercury discharge lamp and a radio-frequency excited coil surrounding the lamp. The discharge lamp is constructed in the form of a closed loop and is inductively excited by the high power radio-frequency coil. The coil forms the primary coil and the lamp the secondary coil of an air-core transformer. Current in the lamp is excited entirely by the radio frequency magnetic fields passing through the plane of the lamp thereby optically pumping the lasing medium.

6 Claims, 3 Drawing Figures



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[11] **4,189,203**

**Miller**

[45] Feb. 19, 1980

#### [54] CIRCULAR CONNECTOR

[75] Inventor, **John W. Miller, Smyrna, Ga.**

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 927,434

[22] Filed: Jul. 24, 1978

[51] Int. Cl.<sup>2</sup> ..... G01B 7/12; G01B 7/28;  
H01R 13/64

[52] U.S. Cl. .... 339/184 M; 73/1 J

[58] **Field of Search** ..... 73/1 J; 339/184 M, 258 R,  
339/258 RR

**[56] References Cited**  
**PUBLICATIONS**

"Dimensional Evaluation of Tapered Fastener Systems," Interim Technical Report, Lockheed-Georgia Co., Mar. 1977.

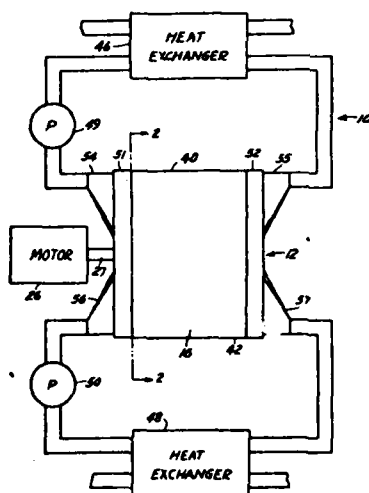
**Primary Examiner**—Eugene F. Desmond  
**Attorney, Agent, or Firm**—Joseph E. Ruzs; Casimer K. Salva

(57) **ABSTRACT**

A high contact density circular connector capable of receiving a multi-element

probe tip used to test the quality of tapered fastener holes. The outer surface of the probe tip has a multiplicity of conductive segments, which are covered by a thin layer of insulation at the end to be inserted into the hole being inspected. When the probe tip is inserted into a hole, capacitors are formed between the conductive segments on the probe tip and the metallic walls of the hole, which can be measured for value and correlated in a computer to disclose hole characteristics such as size, shape, and smoothness. The circular connector is the means by which probe measurements are transferred from the tip into a coaxial cable, for transmission to the electronic processor without molesting the minute capacitance measurements. The connector receives the probe tip, and by means of a key, indexes the angular orientation of the cylindrically shaped probe tip to make appropriate conductive segments on the probe tip mate with the connector clips within the body of the circular connector. With the probe tip in place, a compression ring encircling the connector is rotated to draw the connector body and contacts tightly about the probe tip, thereby insuring effective electrical mating and fixed retention of the probe tip in the connector.

**1 Claim, 3 Drawing Figures**



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AFSC: — Andrews AFB Md 1978

AFSC FORM 791.

### R&D RECORD (Patent Abstract)



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FROM THE AIR FORCE SYSTEMS COMMAND

## United States Patent [19]

Stadnick et al.

[11] 4,189,527

[45] Feb. 19, 1980

### [54] SPHERICAL HEAT PIPE METAL-HYDROGEN CELL

[75] Inventors: Steven J. Stadnick, Redondo Beach;  
Howard H. Rogers, Culver City, both  
of Calif.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 4,244

[22] Filed: Jan. 17, 1979

[51] Int. Cl.<sup>2</sup> ..... H01M 12/06

[52] U.S. Cl. .... 429/26; 429/27;

429/101; 429/120

[58] Field of Search ..... 429/26, 27, 101, 120;  
165/32, 58, 132, 177

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Washington, D.C. 20324

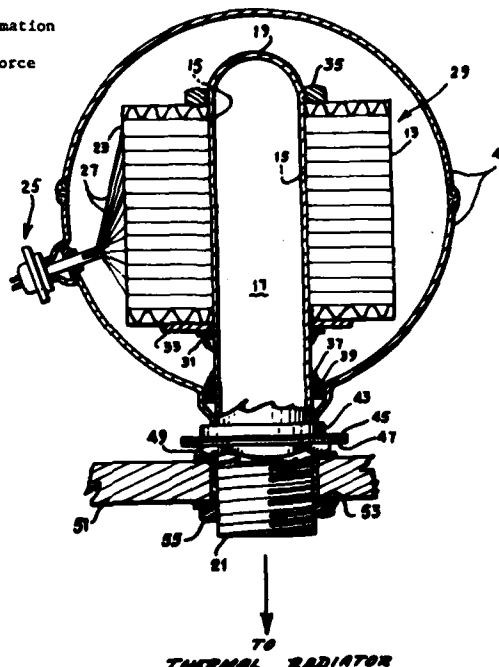
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Primary Examiner—Anthony Skapars  
Attorney, Agent, or Firm—Joseph E. Rusz; Arsen  
Tashjian

### [57] ABSTRACT

A metal-hydrogen cell (e.g., silver-hydrogen or nickel-hydrogen) of heat pipe design wherein a central heat pipe serves as a thermal path, a positive plate conductor and terminal, and a mechanical support for the stack. The positive plates are electrically, mechanically and thermally connected to the heat pipe in the stack center. The negative plate terminals are at the outside edge of the stack. The pressure vessel may be of spherical configuration to provide a light weight design which has a two to one stress advantage in hoop stress over a cylinder with the same wall thickness and internal pressure.

5 Claims, 1 Drawing Figure



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JAT 00181



# PATENT ABSTRACT

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## United States Patent [19]

[11] 4,190,814

Van Workum

[45] Feb. 26, 1980

### [54] SINGLE AXIS RESONATOR FOR LASER

[75] Inventor: John A. Van Workum, Albuquerque, N. Mex.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 882,525

[22] Filed: Mar. 1, 1978

[51] Int. Cl.<sup>2</sup> ..... H01S 3/081

[52] U.S. Cl. .... 331/94.5 C; 350/294

[58] Field of Search ..... 331/94.5 C, 94.5 D; 350/294, 299, 293

### [56] References Cited

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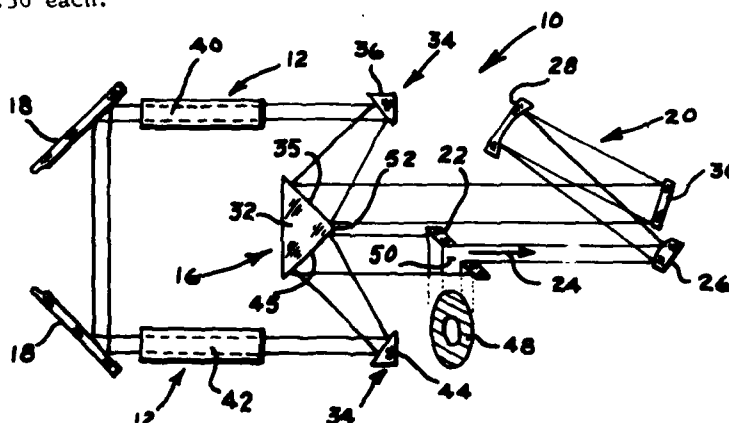
Primary Examiner—William L. Sikes  
Attorney, Agent, or Firm—Joseph E. Rusz; Jacob N. Erlich

### [57] ABSTRACT

A single axis resonator for use within a laser having an annular gain region. The single axis resonator extracts optical power from the annular gain region by the use of a beam expander, reflexicon, corner cube and output coupler, wherein the optical axis of the resonator passes through the center of the output coupler. The reflexicon transforms a substantially elliptically-shaped beam into a crescent-shaped beam which closely resembles the shape of a section of the annular gain region. The crescent-shaped beam is reflected through the gain region several times to build up energy before being translated back into its original shape for reflection out of the laser by the output coupler.

8 Claims, 2 Drawing Figures

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# PATENT ABSTRACT

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## United States Patent [19]

Albanese

[11] 4,190,815

[45] Feb. 26, 1980

- [54] **HIGH POWER HYBRID SWITCH**
- [75] Inventor: Victor J. Albanese, Valley Stream, N.Y.
- [73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
- [21] Appl. No.: 884,882
- [22] Filed: Mar. 9, 1978
- [51] Int. Cl.<sup>2</sup> ..... H01P 1/12
- [52] U.S. Cl. .... 333/101; 333/109; 333/111
- [58] Field of Search ..... 333/7 R, 10, 101, 109, 333/111, 113, 114, 115, 116

- [56] **References Cited**
- U.S. PATENT DOCUMENTS**
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| 3,419,821 | 12/1968 | Jones    | 333/11  |
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| 3,571,765 | 3/1971  | Friedman | 333/31  |

- |           |         |                |        |
|-----------|---------|----------------|--------|
| 3,659,227 | 4/1972  | Whistler       | 333/7  |
| 3,769,610 | 10/1973 | Savarin et al. | 333/10 |

Primary Examiner—Eugene R. LaRoche  
Assistant Examiner—Robert E. Wise  
Attorney, Agent, or Firm—Joseph E. Rusz; Willard R. Matthews, Jr.

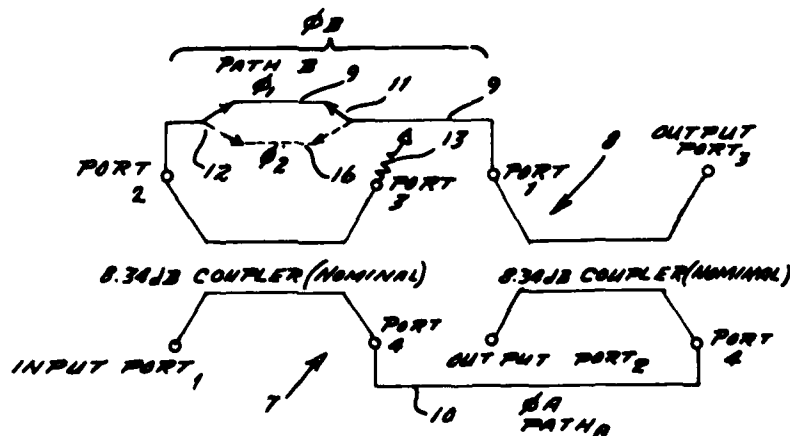
### [57] ABSTRACT

High levels of R.F. power are controlled and switched by means of a hybrid switching network that employs an intermediate power level switch matrix in conjunction with a pair of 8.34 (nominal) directional couplers and a phasing network. The two directional couplers are connected in tandem by two equal length transmission lines to form a broadband quadrature 3dB hybrid. Switching is accomplished by selectively inserting a 180° phase shift means into the lower power carrying transmission line. The phase shifting means can be a length of transmission line, a solid state device, or a Schiffman type phase shifter.

8 Claims, 6 Drawing Figures

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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,190,858**

**Cross et al.**

[45] **Feb. 26, 1980**

[54] **METHOD FOR IMPROVED  
PERFORMANCE OF INFRARED VIDICON  
CAMERAS**

[75] **Inventors:** Edward F. Cross, Los Angeles;  
Wilbur A. Garber, San Pedro, both of  
Calif.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 946,263

[22] **Filed:** Sep. 27, 1978

[51] **Int. Cl.:** H04N 9/33

[52] **U.S. Cl.:** 358/113; 358/217

[58] **Field of Search:** 358/113, 217; 250/333,  
250/351

[56] **References Cited**

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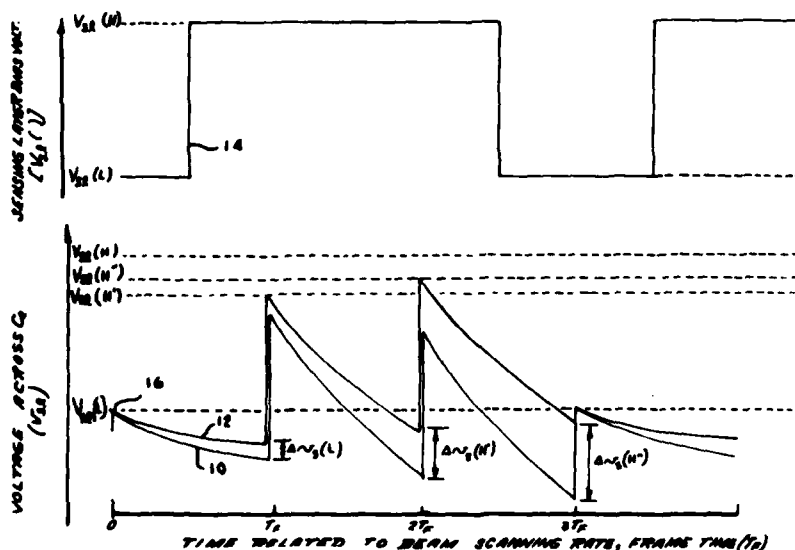
3,646,267 2/1972 Tompsett ..... 358/113  
4,100,574 7/1978 Felix ..... 358/113

**Primary Examiner**—Richard Murray  
**Attorney, Agent, or Firm**—Joseph E. Ruzs; Henry S.  
Miller

[57] **ABSTRACT**

Infra red (IR) vidicon camera tube performance is improved by alternately switching the sensing layer voltage to one of two values in synchronism with the frame rate of an IR TV camera. In operation the sensing layer is switched to a high voltage for two frames and then switched to the normal voltage for one frame readout. Camera tube response is in real time, thereby eliminating need for change in scanning beam rate or subsequent data processing of recorded video data.

**1 Claim, 5 Drawing Figures**



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# PATENT ABSTRACT

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## United States Patent [19]

Quinlan et al.

[11] 4,191,561

[45] Mar. 4, 1980

[54] METHOD FOR THE PRODUCTION OF  
TRIALUMINUM NICKELIDE FIBERS

[75] Inventors: Kenneth P. Quinlan, Newton; Joseph  
J. Hufta, Groton, both of Mass.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 968,874

[22] Filed: Dec. 12, 1978

[51] Int. Cl.<sup>2</sup> ..... C23F 1/02

[52] U.S. Cl. .... 75/101 R; 252/79.4;  
423/132; 428/611; 75/138

[58] Field of Search ..... 75/101 R, 101 BE, 104,  
75/111, 114, 121, 138; 428/611; 156/665, 656;  
252/79.4; 423/132, DIG. 14

[56] References Cited

### U.S. PATENT DOCUMENTS

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Prescott, F. J., et al; "Sequestering Agents In Alumi-  
num Etching" *Metal Finishing*, Oct. 1953, pp. 65-67.

Primary Examiner—L. Dewayne Rutledge

Assistant Examiner—Michael L. Lewis

Attorney, Agent, or Firm—Joseph E. Ruzs; William J.  
O'Brien

### [57] ABSTRACT

A process for the production of trialuminum nickelide  
fibers which involves the utilization of an oxalic acid-  
hydrogen chloride mixture for separating the fibers  
from a solid, two-phase, composite matrix of aluminum  
and trialuminum nickelide fibers.

2 Claims, No Drawings

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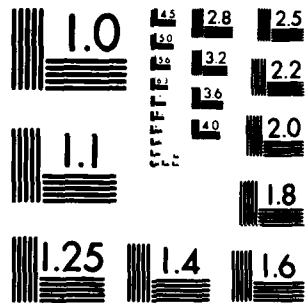
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## United States Patent [19]

Jacomini

[11] 4,192,235

[45] Mar. 11, 1980

### [54] RADIANT-ENERGY CONTROLLED PROXIMITY FUZE

[75] Inventor: Omar J. Jacomini, Severna Park, Md.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 381,272

[22] Filed: Jul. 8, 1964

[51] Int. Cl.<sup>2</sup> ..... F42C 13/04

[52] U.S. Cl. .... 102/214

[58] Field of Search ..... 102/70.2 P, 214;  
343/7 PF

### [56] References Cited

#### U.S. PATENT DOCUMENTS

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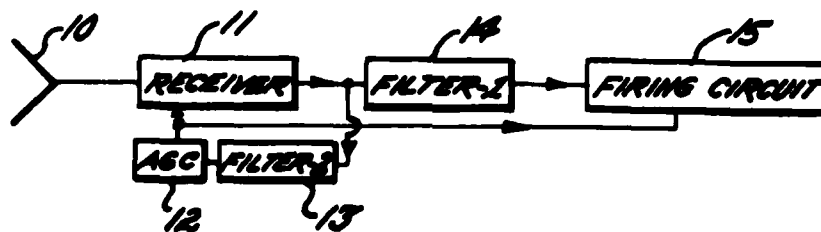
Primary Examiner—Charles T. Jordan  
Attorney, Agent, or Firm—Joseph E. Ruzs; Cedric H. Kuhn

### EXEMPLARY CLAIM

1. A receiver for the transmitter-receiver combination

1 Claim, 4 Drawing Figures

utilized with a proximity fuze comprising a receiver arranged to be gain controlled, said receiver being fed the radiant energy reflected by a target, first and second filters, each having predetermined characteristics, said first filter having a predetermined characteristic being essentially a smoothed value of a predetermined voltage over preselected time, said second filter having a characteristic being essentially a smoothed value of said predetermined voltage over said preselected time minus a time seconds earlier, and each directly receiving the output signal from said receiver, an automatic gain control circuit interconnecting said second filter with said receiver, said automatic gain control operating so that the output signal from said first filter is the ratio between said value of said predetermined voltage over said preselected time, and said value of said predetermined voltage over said preselected time minus said time seconds earlier, and a firing circuit for said proximity fuze, said circuit being interconnected to said receiver by way of said first filter and also receiving an output signal from said automatic gain control circuit for addition to the output signal from said first filter.



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# PATENT ABSTRACT

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## United States Patent [19]

Boddie

[11] 4,192,302

[45] Mar. 11, 1980

### [54] HEPATIC ISOLATION AND PERFUSION CIRCUIT ASSEMBLY

[76] Inventor: Arthur W. Boddie, 110 Chimney  
Rock, San Antonio, Tex. 78231

[21] Appl. No.: 941,715

[22] Filed: Sep. 12, 1978

[51] Int. Cl.<sup>2</sup> ..... E03D 9/04

[52] U.S. Cl. .... 128/214 R; 128/214 B;  
128/1 R; 128/DIG. 3

[58] Field of Search .... 128/214 R, 214 B, DIG. 3,  
128/1 R; 422/45; 210/321

### [56] References Cited

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Article—"Development of a Technic for Isolated Perfusion of the Liver", Ausman, *N. Y. State Medical Journal*, 1961, pp. 3993-3997.

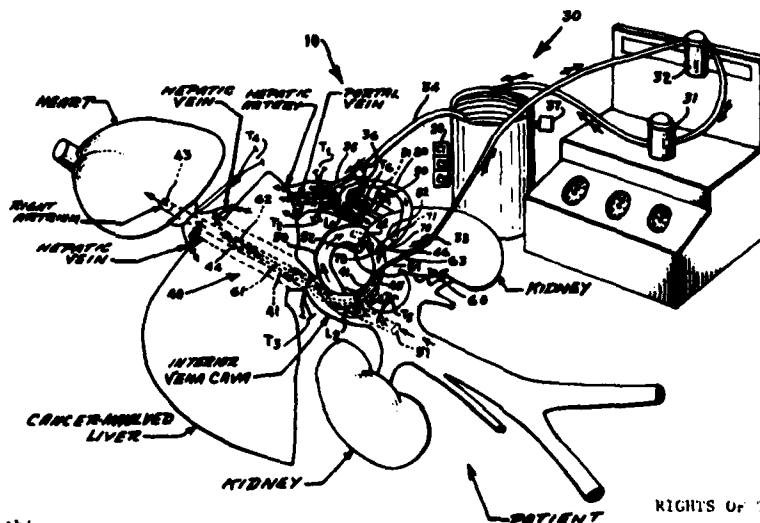
Article—"A Technique of Isolated Perfusion of the Liver", Chung, et al. *Surgery*, 1962, vol. 51, No. 4, pp. 508-511.

Primary Examiner—Henry K. Artis  
Attorney, Agent, or Firm—Joseph E. Ruz; Arsen  
Tashjian

### [57] ABSTRACT

The assembly, through a plurality of shunts, allows blood circulation from the lower part of a patient's body and from the intestines to flow unimpeded to the heart, while isolating hepatic venous blood containing toxic agents from the general circulation and returning it to a heart-lung machine. As a result, the assembly can be used to perfuse the liver, of a patient which has become involved with cancer, with extremely high doses of cancericidal chemotherapy agents, while at the same time avoiding the toxic effects of these agents on the patient's body as a whole.

5 Claims, 3 Drawing Figures



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United States Patent [19]

[11] 4,192,967

Prucha et al.

[45] Mar. 11, 1980

[54] TELETYPE MIXER APPARATUS FOR  
CODING AND DECODING

[56]

## References Cited

### U.S. PATENT DOCUMENTS

[75] Inventors: Martin J. Prucha, Mountain View,  
Calif.; Willis L. Donaldson; Douglas  
N. Travers, both of San Antonio,  
Tex.

2,401,855	6/1946	Briggs et al.	178/22
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[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

Primary Examiner—Howard A. Birmiel  
Attorney, Agent, or Firm—Joseph E. Ruz; George Fine

[21] Appl. No.: 554,286

## [57] ABSTRACT

Apparatus for terminating teletype signal lines and mix-  
ing cryptographic teletype signals to furnish an enci-  
phered teletype signal including a secondary operating  
mode of the mixer unit to retransmit the incoming tele-  
type signal in the event enciphering or deciphering is  
not required.

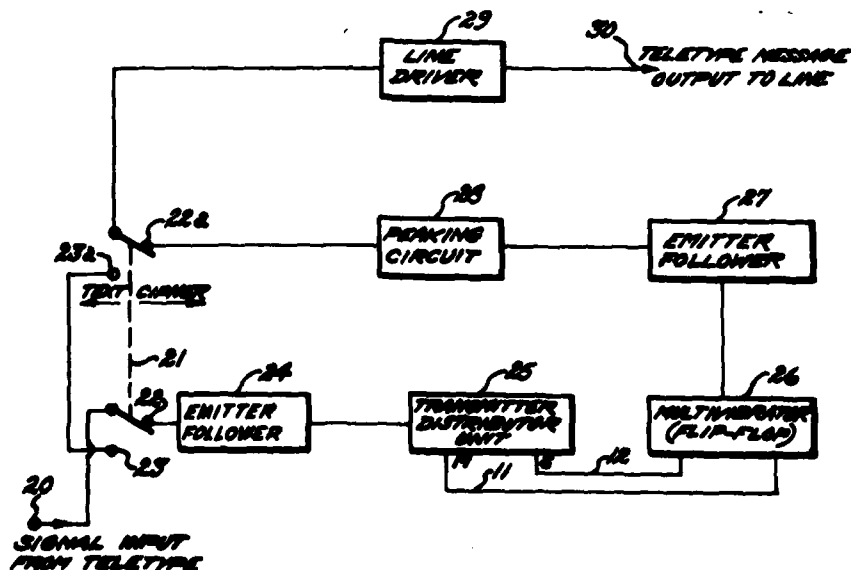
[22] Filed: May 26, 1966

[51] Int. Cl.<sup>2</sup> ..... H04L 9/02

[52] U.S. Cl. .... 178/22

[58] Field of Search ..... 178/22

4 Claims, 5 Drawing Figures



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# PATENT ABSTRACT

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**United States Patent** [19]

**Millberger et al.**

[11] **4,193,032**

[45] **Mar. 11, 1980**

**[54] HIGH SPEED TRANSMITTER PULSER**

**[75] Inventors:** Walter E. Millberger, Serverna Park;  
Larry G. Wright, Pasadena, both of  
Md.

**[73] Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

**[21] Appl. No.:** 826,057

**[22] Filed:** May 8, 1969

**[51] Int. Cl.:** G01S 7/38

**[52] U.S. Cl.:** 178/114; 375/68;

343/18 E

**[58] Field of Search:** 343/18 E; 325/104, 120,  
325/132, 150, 169

**[56]**

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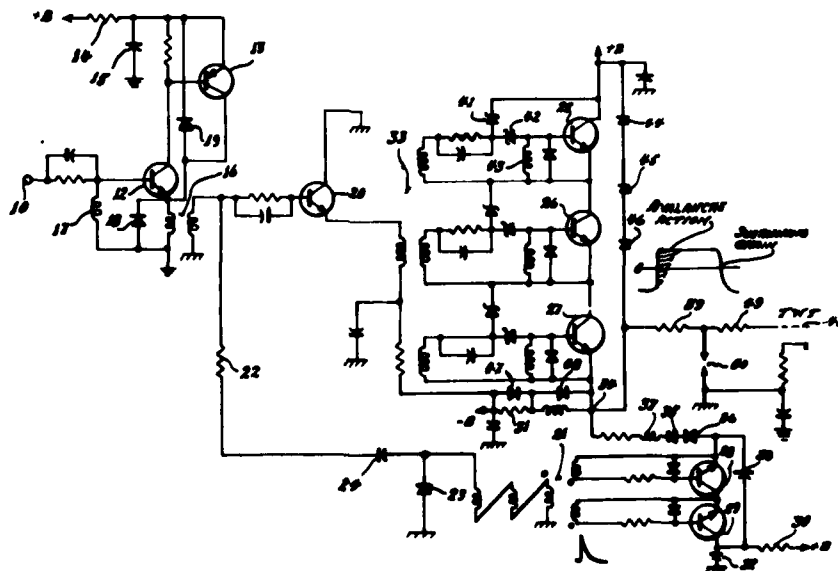
**Primary Examiner**—T. H. Tubbesing  
**Attorney, Agent, or Firm**—Joseph E. Rusz; George Fine

**[57]**

**ABSTRACT**

An apparatus for pulsing a high speed transmitter having pulser delay times in the nanosecond range. The combination of solid state and spark gap devices provide protection against high voltage arcs for both transient and power follow-through conditions.

**6 Claims, 1 Drawing Figure**



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**United States Patent** [11]

**4,193,047**

**Carter et al.**

**[45] Mar. 11, 1980**

[54] **FREQUENCY SELECTIVE  
FERRIMAGNETIC POWER LIMITER**

[75] **Inventors:** Philip S. Carter, Palo Alto, Calif.;  
Steven N. Stitzer, Ellicott City;  
Harry Goldie, Randallstown, both of  
Md.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 902,130

[22] **Filed:** May 2, 1978

[51] **Int. Cl.:** H01P 1/22

[52] **U.S. Cl.:** 333/17 L; 333/24.2;  
333/222

[58] **Field of Search:** 333/17 L, 24.2, 73 S,  
333/204, 205

[56] **References Cited**

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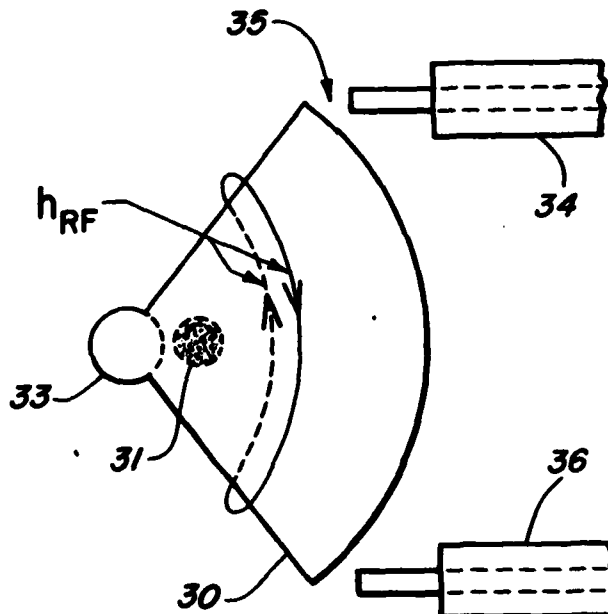
**Primary Examiner**—Paul L. Gensler

**Attorney, Agent, or Firm**—Joseph E. Ruzs; Robert Kern  
Duncan

[57] **ABSTRACT**

Two sectoral radial resonators coupled at their centers of radii by a strip transmission line and doubly loaded with opposing ferrimagnetic spheres between the said strip transmission line and the ground planes provides a frequency selective power limiter.

1 Claim, 10 Drawing Figures



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AFSC — Andrews AFB MD 1978



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United States Patent [19]

[11] 4,193,059

Harris

[45] Mar. 11, 1980

- [54] ATTITUDE INDICATOR COMPARATOR  
WARNING SYSTEM
- [75] Inventor: Richard L. Harris, Oklahoma City,  
Okla.
- [73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.
- [21] Appl. No.: 915,788
- [22] Filed: Jan. 15, 1978
- [51] Int. Cl.<sup>2</sup> ..... G08B 21/08; G08C 19/46
- [52] U.S. Cl. .... 340/27 AT; 33/328;  
340/27 R; 340/181; 340/198; 340/315;  
340/681; 318/654
- [58] Field of Search ..... 340/27 R, 27 NA, 27 AT,  
340/181, 198, 315, 681; 33/328, 329, 330;  
318/654; 244/177, 194, 196

- 2,794,975 6/1957 Sedgfield et al. .... 340/198  
2,810,119 10/1957 Brown ..... 340/27 NA  
2,950,460 8/1960 Selfried et al. .... 340/27 R  
3,094,691 6/1963 Treffles ..... 340/181  
3,534,349 10/1970 Mallinson ..... 340/198  
3,537,086 10/1970 Andress ..... 340/27 R

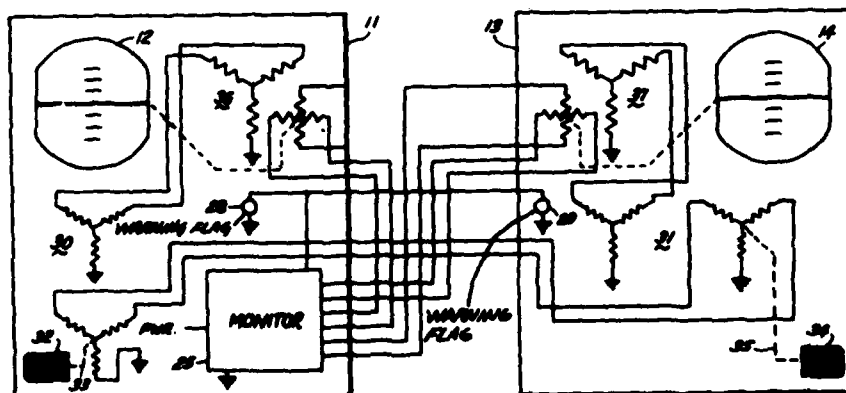
Primary Examiner—John W. Caldwell, Sr.  
Assistant Examiner—James J. Groody  
Attorney, Agent, or Firm—Joseph E. Ruz; Robert Kern  
Duncan

## [57] ABSTRACT

The indications of attitude indicators at two different indicating locations that are indicating the same parameter but actuated from different sources, are monitored for the same indication by electrically interconnecting two transolvers that are mechanically coupled to the respective attitude indicator at each location. A monitor, at one indicating location, furnishes the excitation for the transolver at the other location and by the magnitudes of the sine and cosine outputs of the local transolver furnishes flag indication of any system defects of either indicator at each location.

4 Claims, 3 Drawing Figures

- [56] References Cited
- U.S. PATENT DOCUMENTS
- 2,428,402 10/1947 Winterbottom ..... 340/315  
2,432,772 12/1947 Lear ..... 340/315  
2,596,698 5/1952 Laine et al. .... 340/198



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JAT 00191



# PATENT ABSTRACT

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## United States Patent [19]

Zoltai

[11] 4,193,061

[45] Mar. 11, 1980

### [54] ELECTRONIC AUTHENTICATION SYSTEM

[76] Inventor: John T. Zoltai, P.O. Box 5463, Santa Fe, N. Mex. 87502

[21] Appl. No.: 923,749

[22] Filed: Jul. 11, 1978

[51] Int. Cl.<sup>2</sup> ..... H04Q 3/02

[52] U.S. Cl. .... 371/67; 235/382;

340/149 R

[58] Field of Search ..... 340/146.1 C, 146.1 R,  
340/146.1 E, 149 R, 149 A; 364/200, 900;  
235/380, 382

### [56] References Cited

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3,794,813 2/1974 Spetz ..... 235/382

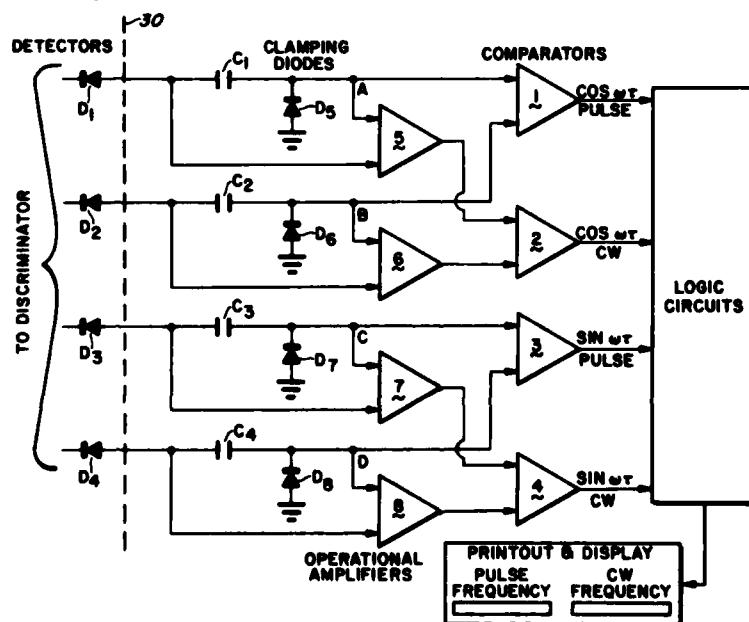
3,846,622 11/1974 Meyer ..... 235/382  
3,956,615 5/1976 Anderson et al. .... 340/149 A  
4,016,404 4/1977 Appleton ..... 235/380  
4,017,835 4/1977 Randolph ..... 235/380  
4,114,027 9/1978 Slater et al. .... 340/149 A  
4,142,097 2/1979 Ulich ..... 340/149 R

Primary Examiner—Charles E. Atkinson  
Attorney, Agent, or Firm—Joseph E. Ruz; William  
Stepanishen

### [57] ABSTRACT

An electronic authentication system utilizing a predetermined random code to simultaneously interrogate the control unit and the remote unit by a comparison of the response of each unit.

7 Claims, 6 Drawing Figures



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# PATENT ABSTRACT

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**United States Patent** [19]

[11] **4,193,066**

**Morrison et al.**

[45] **Mar. 11, 1980**

[54] **AUTOMATIC BIAS ADJUSTMENT CIRCUIT  
FOR A SUCCESSIVE RANGED  
ANALOG/DIGITAL CONVERTER**

3,786,491 1/1974 Carleton ..... 340/347 CC  
3,889,255 6/1975 Pettersen ..... 340/347 CC

[75] **Inventors:** Steven Morrison; Thomas K. Lisle,  
Jr.; Clarence C. Glover, all of  
Baltimore, Md.

**Primary Examiner**—Charles D. Miller  
**Attorney, Agent, or Firm**—Joseph E. Ruz; Willard R.  
Matthews, Jr.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

## [57] ABSTRACT

[21] **Appl. No.:** 898,047

An automatic bias adjustment circuit for a successive ranged analog/digital converter (SRADC) that eliminates the need for manual bias adjustments and calibration inputs. The bias correction circuit comprehends dual flip flops that are triggered by selected comparators of the SRADC n bit parallel analog/digital converter. The flip flop output signals control up/down counters whose output bits drive digital/analog converter. The digital/analog converted signals are introduced back into the SRADC analog chain to zero bias errors in a particular sub-range. A disabling circuit prevents operation of the bias adjustment circuits for the first sub-range.

[22] **Filed:** Apr. 20, 1978

[51] **Int. Cl.<sup>2</sup>** ..... H03K 13/02

[52] **U.S. Cl.** ..... 340/347 CC; 340/347 AD

[58] **Field of Search** ..... 340/347 AD, 347 CC,  
340/347 M; 235/310

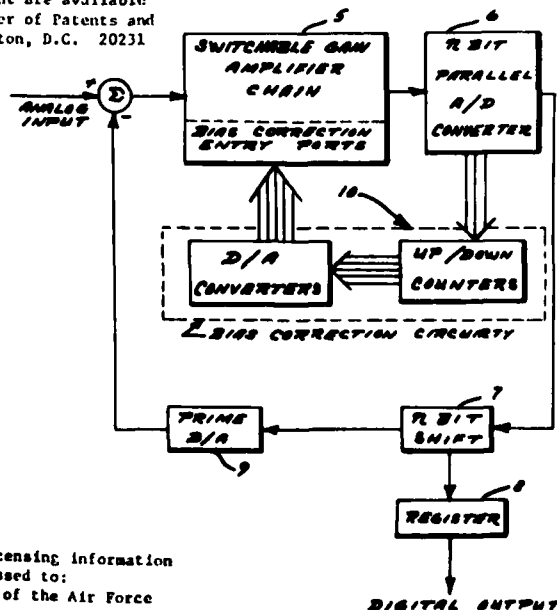
## [56] References Cited

### U.S. PATENT DOCUMENTS

3,501,625 3/1970 Gorbatenko ..... 235/310  
3,646,586 2/1972 Kurz ..... 340/347 AD  
3,754,232 8/1973 Gut ..... 340/347 CC

2 Claims, 3 Drawing Figures

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**United States Patent** [19]

[11] **4,194,186**

**Morrison et al.**

[45] **Mar. 18, 1980**

[54] **DIGITAL HYSTERESIS CIRCUIT**

[75] Inventors: **Steven Morrison; Thomas K. Lisle, Jr.,** both of Baltimore, Md.

[73] Assignee: **The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

[21] Appl. No.: **898,867**

[22] Filed: **Apr. 28, 1978**

[51] Int. Cl.<sup>2</sup> ..... **H03K 13/02**

[52] U.S. Cl. .... **340/347 AD; 340/347 CC**

[58] Field of Search ..... **340/347 AD, 347 CC; 235/92 PE**

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

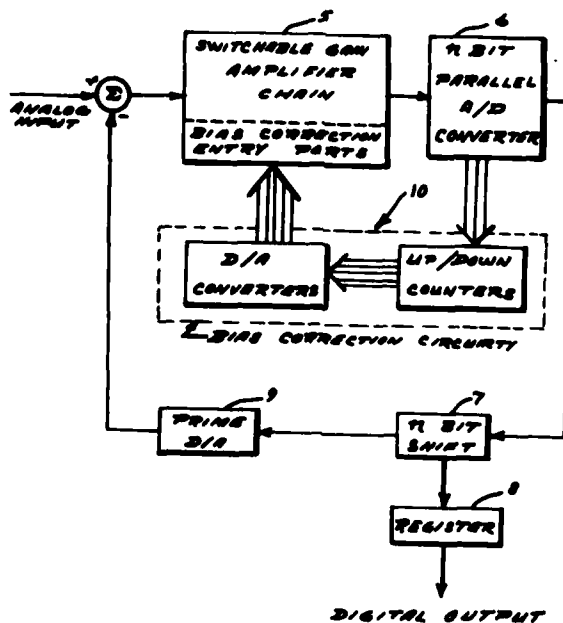
3,786,488	1/1974	Ahlgren	235/92 PE
3,786,491	1/1974	Carlton	340/347 CC
4,084,082	4/1978	Alfke	235/92 PE

*Primary Examiner—Charles D. Miller*  
*Attorney, Agent, or Firm—Joseph E. Ruz; Willard R. Matthews, Jr.*

[57] **ABSTRACT**

Noise induced hunting is eliminated in successive ranged digital/analog converter bias correction circuits by means of a digital hysteresis circuit. The digital hysteresis circuit comprehends a first up/down counter that counts to its extremums from a pre-set intermediate state in response to enable and up/down input signals. For each extremum count an enable output pulse and a reset pulse is generated at the counter output. The enable output pulses are counted by a second up/down counter the output of which drives a digital/analog converter. Each reset pulse resets the first up/down counter to its pre-set state.

**2 Claims, 5 Drawing Figures**



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# PATENT ABSTRACT

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United States Patent [19]

Goldie

[11] 4,194,200

[45] Mar. 18, 1980

[54] COMBINED RECEIVER PROTECTOR, AGC  
ATTENUATOR AND SENSITIVITY TIME  
CONTROL DEVICE

[75] Inventor: Harry Goldie, Randallstown, Md.

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 956,704

[22] Filed: Nov. 1, 1978

## Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 801,714, May 31,  
1977, abandoned.

[51] Int. Cl.<sup>2</sup> ..... G01S 7/34

[52] U.S. Cl. .... 343/5 SM; 343/7 AG;  
333/13

[58] Field of Search ..... 333/13; 343/5 SM, 7 AG

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## [56] References Cited

### U.S. PATENT DOCUMENTS

2,984,741	5/1961	Bronstein et al. ....	343/5 SM X
3,588,894	6/1971	Prickett .....	343/7 AG
3,725,913	4/1973	Roehl et al. ....	343/5 SM
3,949,398	4/1976	Donahue .....	343/5 SM X
4,027,255	5/1977	Blakeney .....	333/13

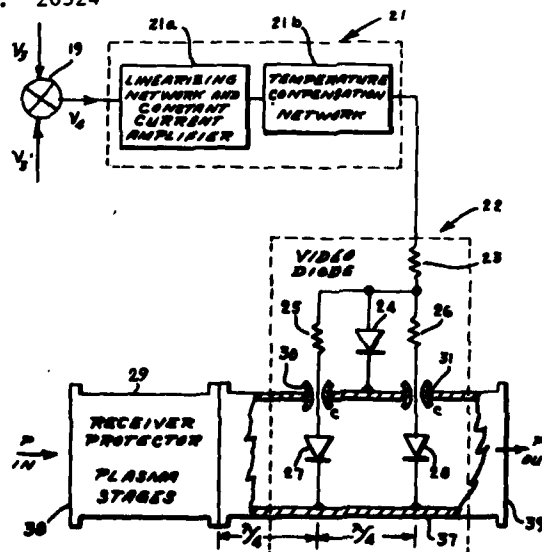
Primary Examiner—T. H. Tubbesing  
Attorney, Agent, or Firm—Joseph E. Rusz; Willard R.  
Matthews

## [57] ABSTRACT

The passive receiver protector, AGC attenuator and sensitivity time control functions of a radar are combined in a single device which performs the functions in front of the radar low noise amplifier with relatively low loss. The receiver protector utilizes semiconductor diodes which operate as a power limiter during transmit and as precision attenuators during receive.

## 9 Claims, 6 Drawing Figures

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**FROM THE AIR FORCE SYSTEMS COMMAND**

## United States Patent [19]

(11) **4,194,205**

Willmore et al.

**[45] Mar. 18, 1980**

- [54] **R.F. POWER AND VIDEO MODULATION MONITORING CIRCUIT FOR COUNTERMEASURES SYSTEM**
- [75] **Inventors:** Robert R. Willmore, Millersville; William B. McCartney, Odenton, both of Md.
- [73] **Assignee:** The United States of America as represented by the Secretary of the Air Force, Washington, D.C.
- [21] **Appl. No.:** 868,969
- [22] **Filed:** Jan. 6, 1978
- [51] **Int. Cl.<sup>2</sup>** ..... G01S 7/38; G01S 7/40; H04K 3/00
- [52] **U.S. Cl.** ..... 343/17.7; 343/18 E
- [58] **Field of Search** ..... 343/17.7, 18 E

- |           |         |                        |            |
|-----------|---------|------------------------|------------|
| 4,114,152 | 9/1978  | Wiedemann .....        | 343/18 E X |
| 4,121,214 | 10/1978 | Marinaccio et al. .... | 343/18 E   |
| 4,122,452 | 10/1978 | Richmond .....         | 343/18 E   |

**Primary Examiner—Malcolm F. Hubler**  
**Attorney, Agent, or Firm—Joseph E. Ruzs; Willard R. Matthews**

[57] **ABSTRACT**

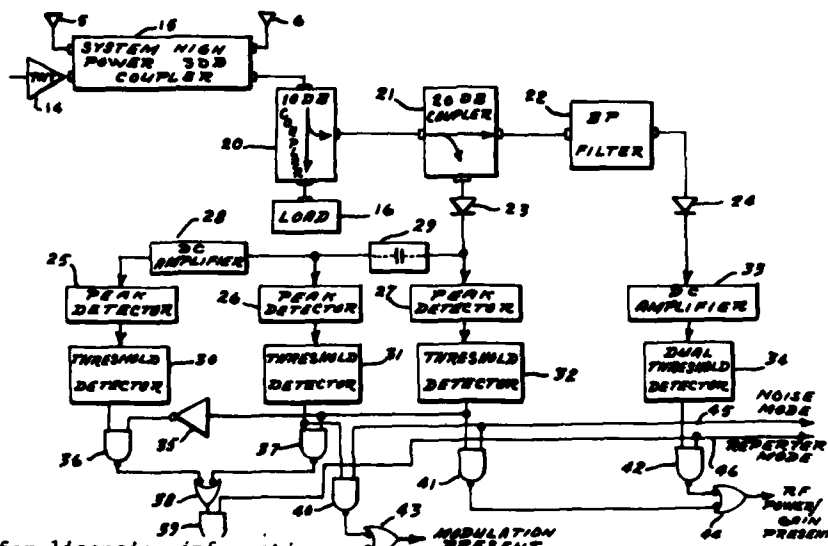
The RF power and video modulation monitoring circuit of the invention provides the unique capability of monitoring the performance of a repeater/noise jammer countermeasures system when the system is operating in either the repeater or the noise jamming mode. In the repeater mode the systems noise level is measured in an unused portion of the countermeasures system frequency band to provide a monitor of system gain and antenna VSWR. In the noise mode crystal detection and threshold comparison provides an indication of RF power output. In either jamming mode the measurement of AC in the detected output provides a monitor of modulation.

### References Cited

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|-----------|---------|------------------|------------|
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| 3,543,270 | 11/1970 | Wiley, Jr. ....  | 343/17.7 X |
| 3,792,475 | 2/1974  | Smetana .....    | 343/17.7   |

### 3 Claims, 2 Drawing Figures



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JAT 00196



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## United States Patent [19]

Tsui et al.

[11] 4,194,206

[45] Mar. 18, 1980

[54] INSTANTANEOUS FREQUENCY  
MEASUREMENT (IFM) RECEIVER WITH  
CAPABILITY TO SEPARATE cw AND  
PULSED SIGNALS

[75] Inventors: James B. Y. Tsui, Centerville; Gerd  
H. Schrick, Dayton, both of Ohio

[73] Assignee: The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] Appl. No.: 240

[22] Filed: Dec. 22, 1978

[51] Int. Cl.<sup>2</sup> G01S 7/36

[52] U.S. Cl. 343/18 E; 324/78 F

[58] Field of Search 324/77 E, 78 F;  
343/18 E

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### [56] References Cited

#### U.S. PATENT DOCUMENTS

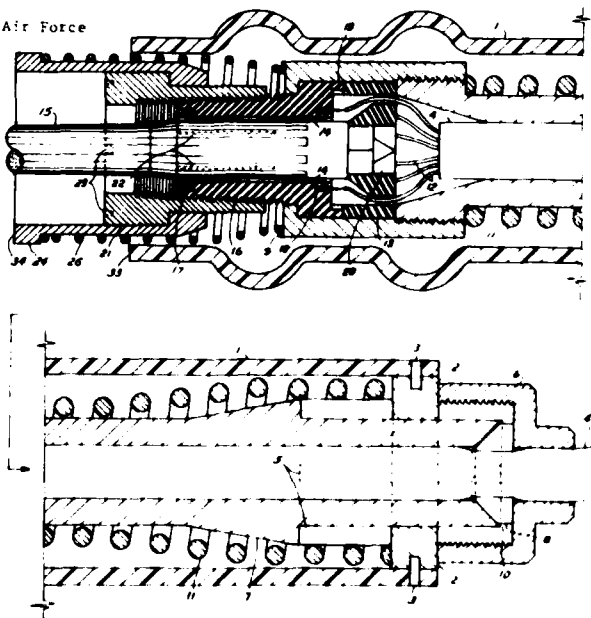
3,922,676	11/1975	O'Berry et al.	343/18 E X
3,986,188	10/1976	True	343/18 E
4,025,920	5/1977	Reitboeck et al.	343/18 E X
4,146,892	3/1979	Overman et al.	343/18 E

Primary Examiner—T. H. Tubbesing  
Attorney, Agent, or Firm—Joseph E. Rusz; Robert Kern  
Duncan

### [57] ABSTRACT

The video outputs of the correlators of a conventional IFM receiver are split by capacitors to obtain (1) pulse signals only and (2) pulse plus cw signals. Combining these signals in differential amplifiers, frequency readings are provided in the normal manner with the improvement that the individual frequency readings of simultaneously received pulse and cw signals are provided.

2 Claims, 2 Drawing Figures



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**United States Patent** [19]

[11] **4,194,209**

**Coulbourn, Jr.**

[45] **Mar. 18, 1980**

[54] **BROADBAND WAVEGUIDE LENS  
ANTENNA AND METHOD OF  
FABRICATION**

[75] **Inventor:** Charles B. Coulbourn, Jr., Rolling  
Hills Estates, Calif.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

[21] **Appl. No.:** 866,187

[22] **Filed:** Dec. 30, 1977

[51] **Int. Cl.:** H01L 19/06

[52] **U.S. Cl.:** 343/753; 343/910

[58] **Field of Search:** 343/909-911 R,  
343/753, 754, 756

[56] **References Cited**

## U.S. PATENT DOCUMENTS

2,547,416	4/1951	Skellett	343/910
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2,640,154	5/1953	Kock	343/910
2,729,816	1/1956	Crawford	343/909

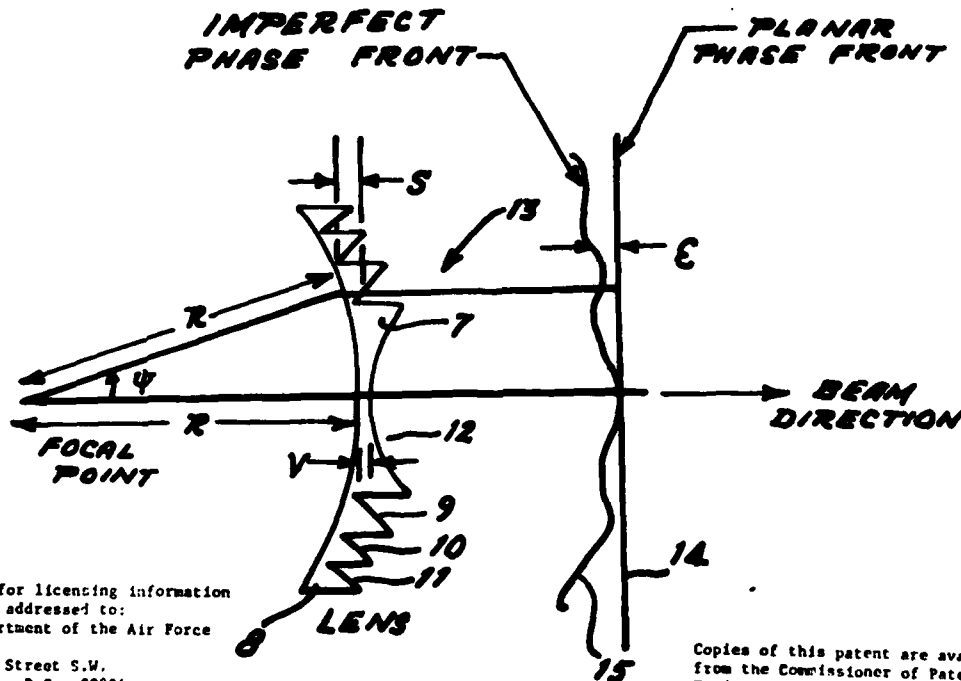
2,736,894 2/1956 Kock ..... 343/910

**Primary Examiner**—David K. Moore  
**Attorney, Agent, or Firm**—Joseph E. Ruz; Willard R.  
Matthews, Jr.

[57] **ABSTRACT**

Increased bandwidth in a waveguide lens antenna is achieved by altering the geometry of the stepped antenna guide plates in a manner that causes the net contribution of the antenna phase dispersion sources to result in zero average aperture phase error. Design equations are included for the fabrication of waveguide lens antenna having any desired degree of phase compensation. In principle, the plate geometry is configured to effect a given relationship between the components of phase error due to guide plate dispersion and the component of phase error due to the guide plate steps. When these components are equal and opposite zero average aperture phase error (maximum bandwidth operation) is achieved.

1 Claim, 13 Drawing Figures



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AFSC — Address AFB Md 1978



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## United States Patent [19]

Tracy et al.

[11] 4,194,708

[45] Mar. 25, 1980

### [54] REMOTELY PILOTED VEHICLE

[75] Inventors: Daniel J. Tracy, Maple Valley; John P. Palmer, Seattle; Daniel J. O'Brien, Kirkland, all of Wash.

[73] Assignee: The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

[21] Appl. No.: 944,441

[22] Filed: Sep. 21, 1978

[51] Int. Cl.<sup>2</sup> ..... B64C 15/02; B64D 1/06

[52] U.S. Cl. .... 244/15; 89/1.5 R;  
244/45 A; 244/100 A; 244/133; 244/135 R;  
244/137 R

[58] Field of Search ..... 244/15, 13, 45 A, 135 R,  
244/135 C, 118 R, 119, 133, 137 R, 100 A, 100  
R, 14, 89, 90 R, 123; 89/1 A, 1.5 R, 1.5 E

### [56] References Cited

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3,362,659	1/1968	Razak	244/45 A

3,869,103	3/1975	Nelson et al.	244/100 R
3,964,698	6/1976	Earl	244/100 A
4,093,156	6/1978	Coe	244/45 A

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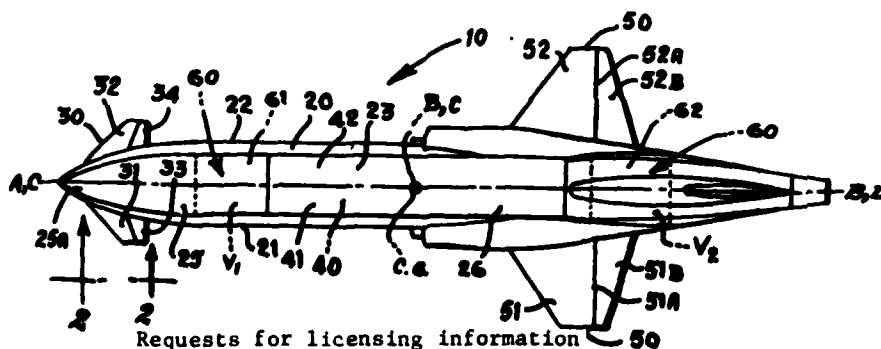
O'Brien et al., "U.S./F.R.G. Advanced Tactical RPV Requirements As Analyzed by Boeing and Dornier", 4th Annual Symposium of the National Association of Remotely Piloted Vehicles, 6/1977, FIGS. 10 & 14.

Primary Examiner—Barry L. Kelmacher  
Attorney, Agent, or Firm—Joseph E. Ruz; Arsen Tashjian

### [57] ABSTRACT

A recoverable remotely piloted vehicle (RPV) having: a deflectable canard/elevator placed very close to the nose tip; a constant (cross) section fuselage; wings mounted low and well aft on the fuselage; elevons; a centrally positioned weapons/payload bay, with doors, located internal of the upper portion of the fuselage; and, inflatable landing skids. The weapon/payload is dropped from the RVP, while the RVP is in flight in an inverted position.

4 Claims, 5 Drawing Figures



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**United States Patent** [19]

[11] **4,194,811**

**Barry**

[45] **Mar. 25, 1980**

[54] **REMOTELY CONTROLLED  
ELECTROMAGNETIC OPTICAL FOCUSING  
ASSEMBLY**

4,092,529 5/1978 Aihara et al. .... 250/201  
4,135,206 1/1979 Kleuters et al. .... 250/201 X

## FOREIGN PATENT DOCUMENTS

1131093 10/1956 France ..... 350/255

[75] **Inventor:** James D. Barry, Los Angeles, Calif.

[73] **Assignee:** The United States of America as  
represented by the Secretary of the  
Air Force, Washington, D.C.

*Primary Examiner*—F. L. Evans  
*Attorney, Agent, or Firm*—Joseph E. Rusz; Arsen  
Tashjian

[21] **Appl. No.:** 902,523

[22] **Filed:** May 3, 1978

[51] **Int. Cl.:** ..... G02B 7/04

[52] **U.S. Cl.:** ..... 350/255

[58] **Field of Search:** ..... 350/46, 47, 255;  
250/201

## [56] References Cited

### U.S. PATENT DOCUMENTS

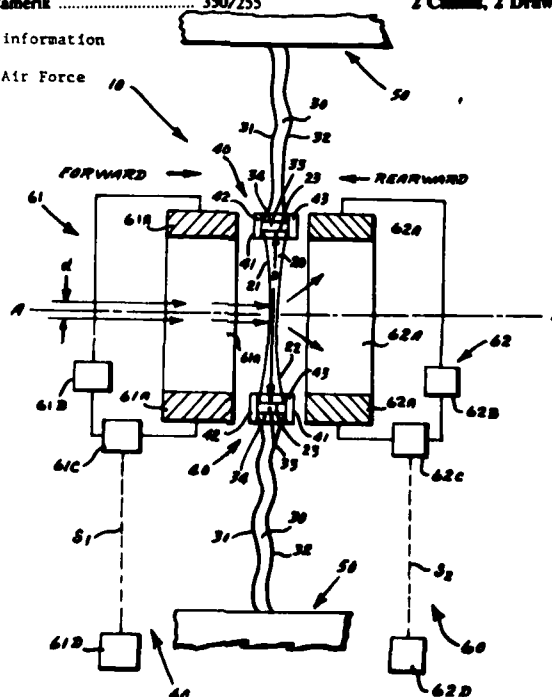
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## [57] ABSTRACT

A lens of an optical system in space is to be moved, and thereby be focused, resulting in the focusing of the system. The lens is mounted, in a diaphragm of resilient material, with a ring-like component made of magnetic material. An electromagnet is positioned on either side of the lens and of the ring-like component. Application of d.c. current, by remote control, through the electromagnets, causes the translational movement, and the necessary focusing, of the lens and, therefore, of the optical system.

2 Claims, 2 Drawing Figures

Requests for licensing information  
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